

MOTOR AGE

DEC 16 1922

Vol. XLII
Number 24

PUBLISHED WEEKLY AT THE MALLERS BUILDING
CHICAGO, DECEMBER 14, 1922

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Three Dollars a Year

Pete says:—

"I feel sorry for any dealer in any town of over ten thousand people in the United States who doesn't know what he is going to be saying to himself before the first of January, 1924.

"This is it:—

"'Why didn't I get the Jordan proposition when it was open in the fall of 1922'!"



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Philadelphia, Pa.

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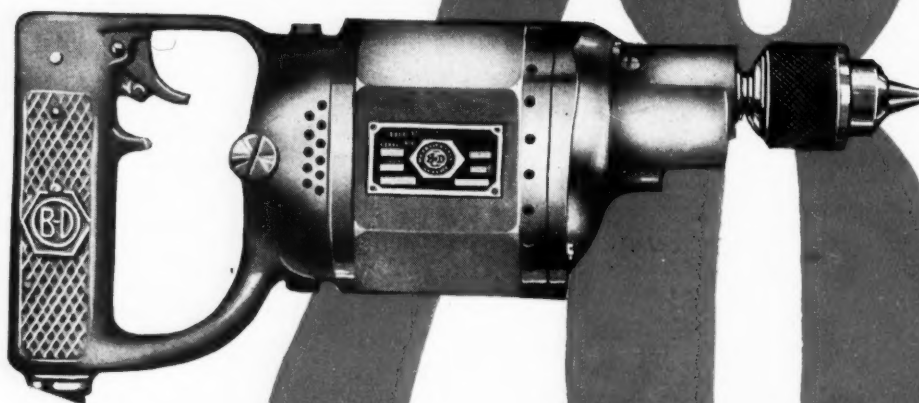
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Owing to the large demand for the Black & Decker Quarter-Inch Portable Electric Drill our production on this unit this year has been practically trebled. This has enabled us to reduce our manufacturing costs, and in accordance with our established policy we are passing the saving on to you.

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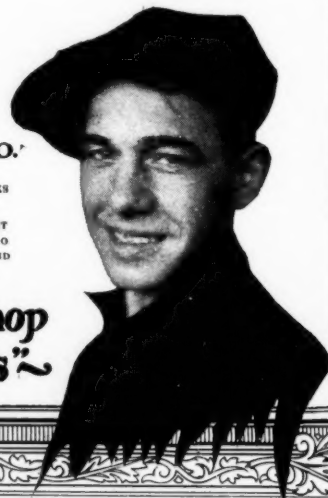
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**"The Well-Equipped Shop
Gets the Business"**



MOTOR AGE

Published Every Thursday by
THE CLASS JOURNAL COMPANY

MALLERS BUILDING
59 East Madison Street,
CHICAGO, ILLINOIS, U. S. A.

Vol. XLII. Chicago, Dec. 14, 1922 No. 24

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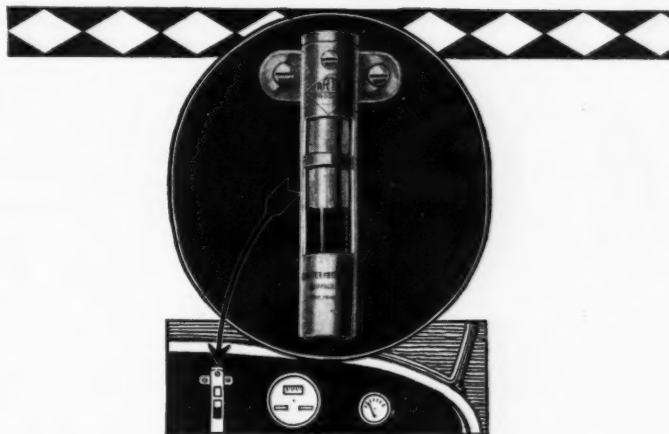
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SUBSCRIPTION RATES	
United States, Mexico and U. S. Possessions	\$ 3.00 per year
Canada	5.00 per year
All Other Countries in Postal Union	6.00 per year
Single Copies	35 cents

Subscriptions accepted only from the Automotive Trade

Entered as Second Class Matter Sept. 19, 1899, at the Post Office at Chicago, Ill., under Act of March 6, 1879.



Cuts Operating Costs For Car Owners

**For Ford
Dodge and
Chevrolet
only \$4⁸⁵**

**For Buick
Oakland and
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only \$5⁸⁵**

On any of the above cars the Carter Oil Gauge ends all doubt as to oil supply. It saves money in repair bills and in oil bills too.

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**Easy to install,
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A Carter Gauge can be installed in a few minutes. In cold weather or warm, winter or summer—it registers with absolute accuracy. There is not a single moving part in it so it can't get out of order.

Carter Gauges are carried in stock by most good jobbers. They are consistently advertised in the leading national publications and are recognized as the standard oil gauge.

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Oldsmobile

in Fort Wayne, Ind.

"We believe the Oldsmobile to be the most complete line of any automobile manufactured today. The Four is the outstanding car in its price class. The Light Eight of course is in a class by itself. This opinion is based on ten years' experience in the retailing of passenger cars, during which time we have sold a number of different makes, including some of the most popular lines on the market today."

—HANKE MOTOR CAR COMPANY
WM. HANKE

October 22, 1922

No need to lose sales to competitors for lack of a complete line, if you are an Oldsmobile dealer. The Oldsmobile franchise equips the dealer with both Fours and Eights—fifteen up-to-date body models. He has a splendid Four roadster at \$955 for one prospect, and the luxurious Eight sedan at \$2,025 for another. Between these two types are a range of models with all the traditional Oldsmobile attractiveness and appeal.

With such a variety of cars, the Oldsmobile dealer is in a position to sell his customers not once, but several times—keeping pace with their increase in buying ability as time goes on.

And in the Oldsmobile Economy 1-ton truck he has still another source of profitable business—but under the same contract, with the same advertising message, and the same parts account.

Is it any wonder that with such a line of merchandise, and backed by the unequalled General Motors financing plan, Oldsmobile dealers are successful dealers?

Why not start the new year as an Oldsmobile dealer? We may have just the opening you want. Communicate with us today.

OLDS MOTOR WORKS, LANSING, MICHIGAN
Division of General Motors Corporation

OLD SMOBILE
A PRODUCT OF GENERAL MOTORS



General view of the salon in ballroom. There were also exhibits in rooms at both ends and in the corridor outside

Finest in Chassis and Body Work at New York Salon

*Six Foreign Countries Vie with America in Offerings
Which Are Different from Stock Models*

NEW YORK, Dec. 9.
THERE can be no doubt of the beauty of the 1923 automobile, but if it were possible to make a success of painting the lily, the exhibitors at the eighteenth annual automobile salon certainly would seem to have qualified themselves for the contract. Car makers from many nations have combined with body builders to present in this exhibition the very finest in chassis and coach-work. As usual, the show is entirely a custom show. It is put on essentially to reach the

wealthy to whom the regular stock chassis and bodies do not appeal, who want something different. The designs of bodies and the painting effects are sufficiently removed from stock practice to fulfill every desire in this regard.

The salon this year has more chassis and body models than last year. Manufacturers from the following nations are represented: England, France, Belgium, Italy, Germany, Spain, and the United States. Twelve coach builders of prominence in the United States have

fitted their offerings to Mexican and foreign chassis of the higher price class.

Of considerable interest to those interested in American cars is the first presentation of Leon Rubay Voitures De Ville which were described in *MOTOR AGE* a few weeks ago. This car, although built in Cleveland, might easily be mistaken for a foreign design. It embraces such features as four wheel brakes, overhead camshaft, wooden running boards finished in natural wood with aluminum strips and grooves between, adjusted headlamps on perpendicular standards, and an aluminum dash-board with all the instruments under one glass.

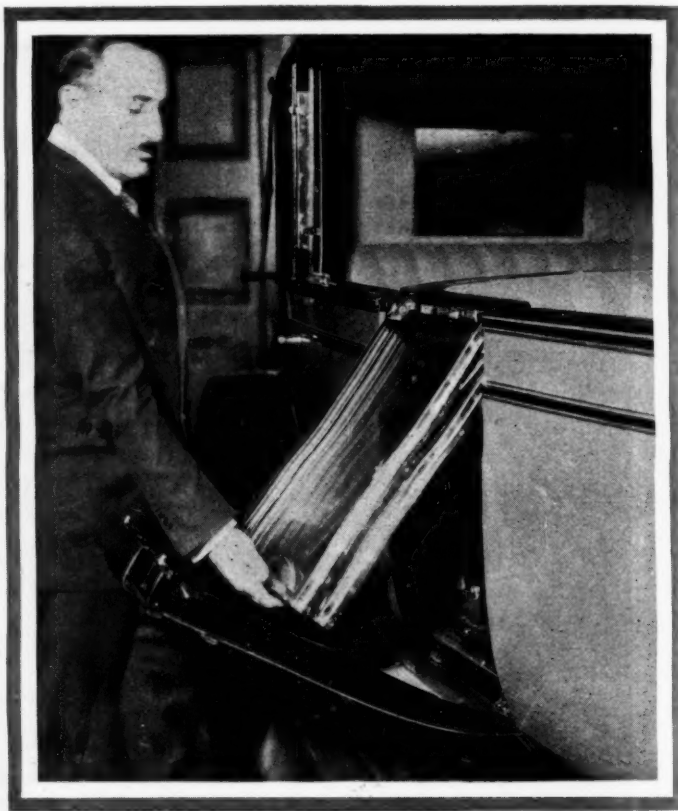
California Type Tops Popular

Several manufacturers have worked out very clever California top types with the glass sashes folding into a compartment when not in use. The Leon Rubay car has such an arrangement in which the sashes hinge downward into a cavity between the front and rear doors. The outside shell of the body simply hinges downward and the sashes hinge upward. In this case there are four sashes. In a Rubay body for the Peerless, with a front door on the left side and a rear door on the right side, there are only two sashes on each side. Those on the left side fold into a cavity where the rear door would ordinarily be and those on the right side fold into the space ordinarily occupied by the front door. A rather complicated but apparently effective system of catches and springs keep these parts from rattling whether the sashes are in use or folded up.

Another innovation in design is shown in one of the Isotta Fraschini limousines. When the doors are closed no steps or running board are visible and the effect of the terminating front and rear fenders is odd. When any door is opened, a step is automatically folded down under it. This particular model incidentally is the extreme in appointments. All interior fittings, such as door handles, as well as the exterior handles, are in ivory. There are shades for all windows, including the front ones, and the heavy plate glass in the windows is cut with an ornamental design, in the corners. All windows operate with lever regulators.

While most of the larger closed bodies are built to be chauffeur driven, there are a number of open models on more of the sport type, with racy lines and a minimum of top hamper. A Locomobile phaeton with a victoria top has a separate hinged cowl attached to the back of the front seat with a one piece windshield which almost meets with the front part of the victoria top. This makes a well enclosed and cozy rear seat for two or three passengers.

Soft tops on closed bodies predominate and there seems to be a general attempt to reduce total height of the cars. A Lanchester coach with a soft top and dark colored interior finish has fore and after stringers and cross carlins finished



One of the appealing body features at the show was the hinged folding sash which drops into a compartment between the doors on the Leon Rubay. This car had a California type top

in light natural wood, giving a somewhat unusual appearance.

A LeBaron body on an Isotta Fraschini chassis is probably the extreme in sport closed models. The top of the hood, starting at a point in front and broadening out past the windshield, is painted a dark brown and the edge of the point is accentuated by a raised bead. Below the body is a dark grey. The front running boards are very long and have a long slope to a point beneath the front door. The slopes of the fender nearly parallels the angle of the brown paint on the hood.

The same body on a Marmon is of the California type with a very low appearance, the sash being nearly square and the frames inset. The inside of the body, although conventional, is very luxurious. A seat arm in the center of the rear seat is removable so that three passengers can be accommodated.

Original Features on Hotchkiss

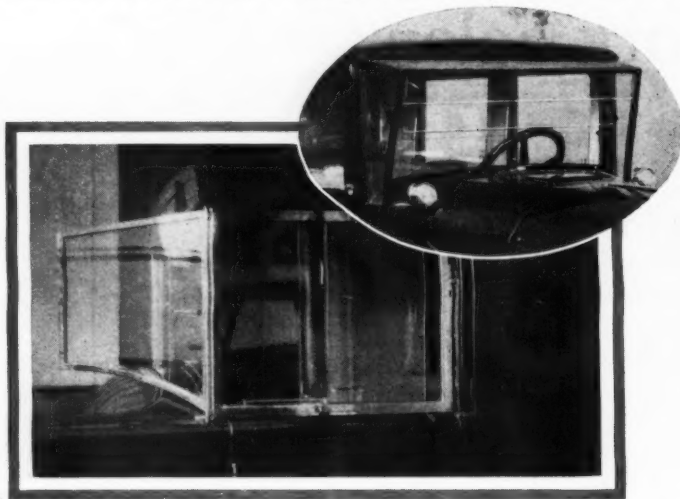
Among the interesting chassis that are not so well known yet are the small Fiat and the two Hotchkiss models. The Hotchkiss models are fours and sixes, both having front wheel brakes and a number of mechanical and constructional ideas not heretofore seen in this country. The rear springs on the six are 63 in., of the cantilever type, but with a compensating and shock absorbing lever under the springs to make easy riding on rough roads at high speeds.

Another feature of this car is the rigid bracing of the frame at the point where the greatest stress occurs due to the action of the rear springs. The cross member of the frame at this point is in reality a cross in the center of which is carried a bearing support for the drive shaft, the universal joint being immediately to the rear of this.

The valves on the six are overhead and are operated by eccentric, not only lifting the valve but returning it to its seat. The valves on the four are cam operated.

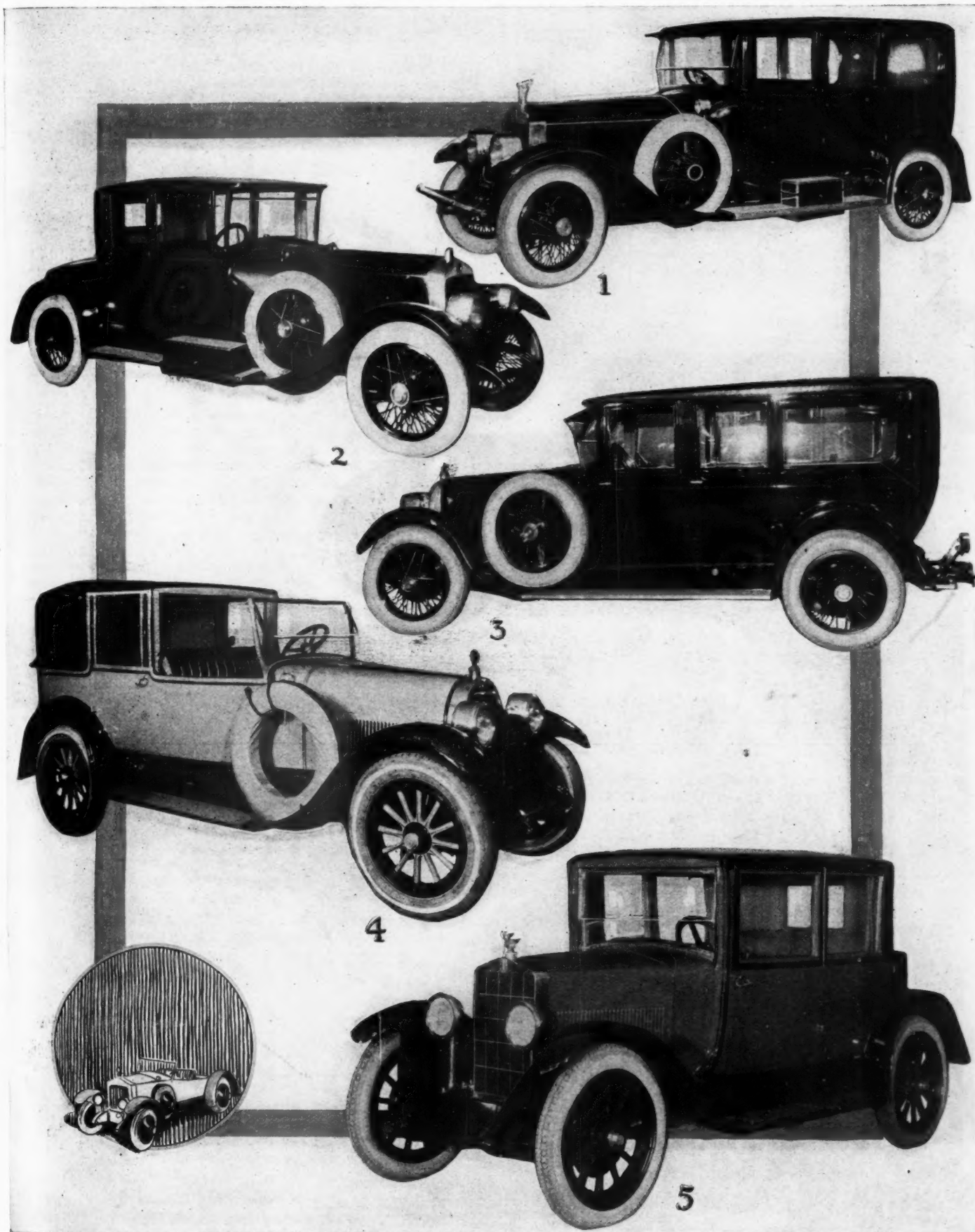
Another foreign car, the well-known Lancia of Italy, is shown. One model is an eight-cylinder chassis with the cylinders staggered and set at a fourteen-degree angle. It is attracting attention from American engineers.

While the four speed gearset has practically disappeared from American chassis, a number of foreign cars at the salon are so equipped. This is doubtless due to the fact that the



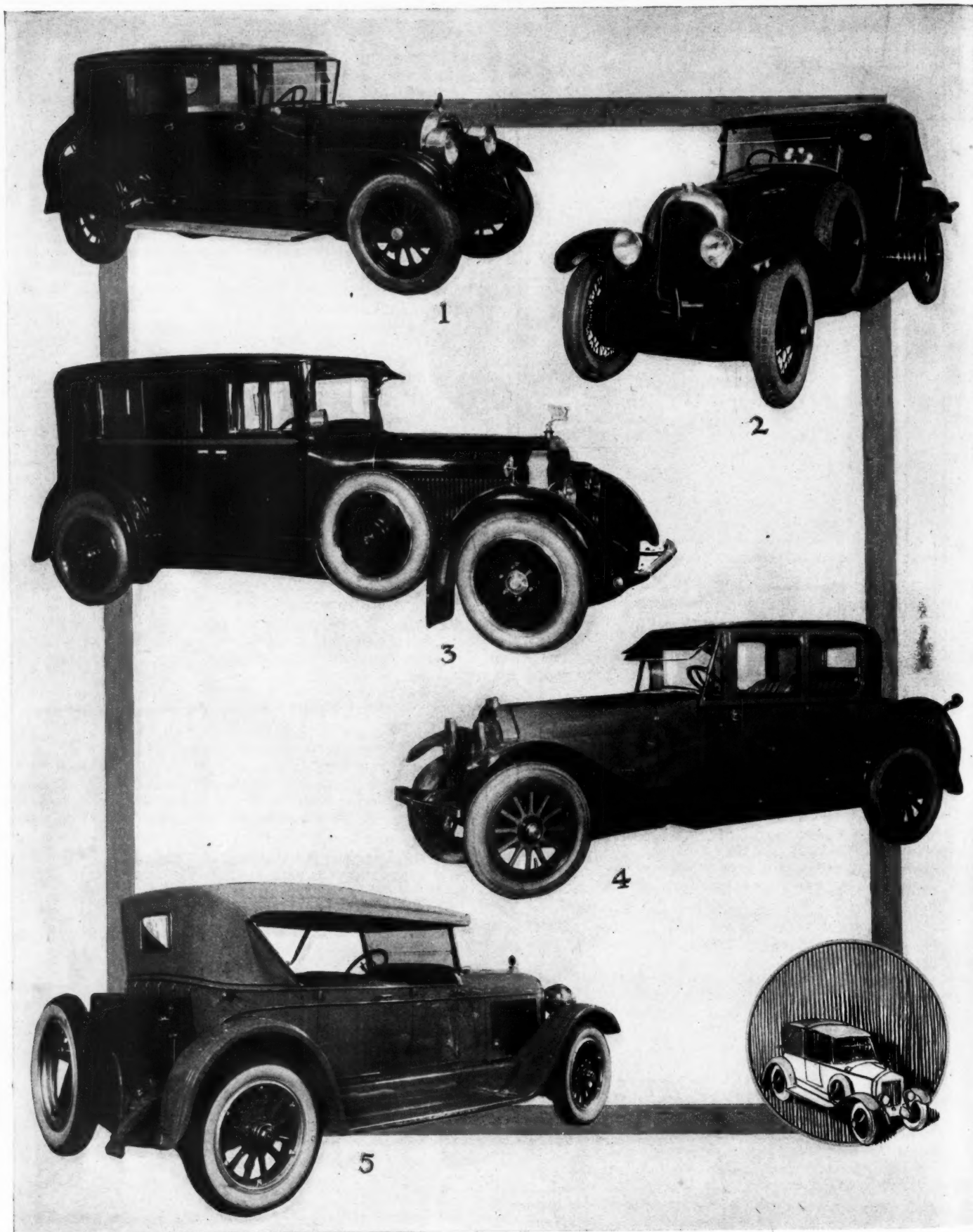
The Voiture cabriolet showed a novelty in the collapsible sashes, which are readily removed when desired

The Peerless equipped with a LeBaron body had a vacuum type windshield, shown in the insert, which affords ventilation without the air being blown on the occupants of the car



Seen at the New York Salon

1—New Rolls-Royce 7-passenger sedan. 2—Lanchester chassis with unusual type body having flexible roof. 3—Duesenberg sedan with Fleetwood body. 4—Demarest body (town car) on Peerless chassis. 5—Leon Rubay two-door sedan. Note the distinctive marking of the radiator, which will be used on all Rubay chassis



Distinctive Body Design Was Featured

1—LeBaron sedan on Peerless chassis with vacuum windshield. 2—Voiture with California type top and folding glass sash. 3—Isotta Fraschini chassis with all-metal Budd body—the most highly “dolled” car at the show—ivory door handles and interior fittings and steps that drop into place when the doors open. 4—Locomobile with Brooks Ostruk body. 5—LeBaron body on Lafayette. The beaded work on this body is especially effective

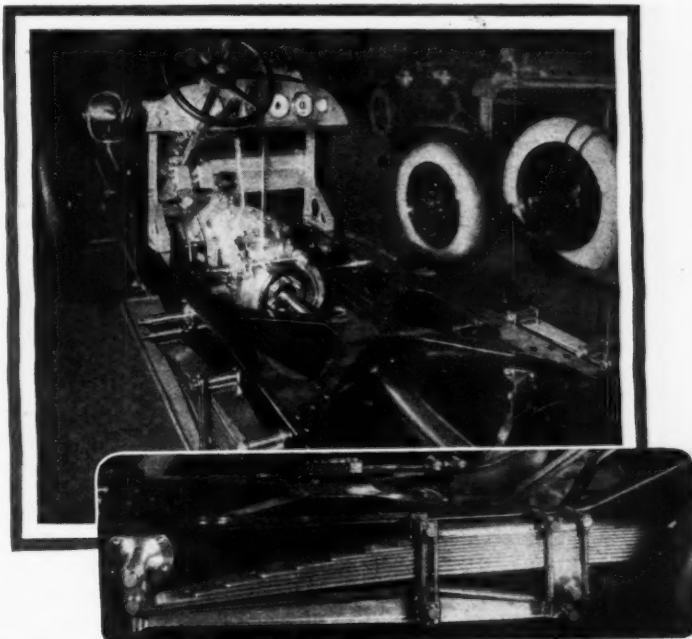
engine sizes and gear ratios suited to city driving in third gear would not be productive of sufficient speed on the open highway. On most of these gearsets the reverse is protected by a latch.

Four-wheel brakes, transmission brakes, metal dash boards, and V type or rounded radiators which characterize many of the foreign cars are the products of American coach builders and practically any of the foreign effects can be reproduced on bodies for American cars of the higher grade.

Rich but Unobtrusive Colors

The colors displayed are for the most part rich but unobtrusive, although there are a number of bodies of the sport type in pink, fire engine red and cream. However, there is not the preponderance of bizarre colors that has characterized some of the previous salon exhibitions. Wheels are mostly wire or disk, although there are a number of models with artillery type wheels. There is a general tendency to provide a place for baggage and many interesting designs are shown. A Winton phaeton with a Healy body has a recess on the rear with wooden strips on the bottom and aluminum guard rails. Sufficient space between the front of the recess and spare tires allows for carrying a good sized trunk.

The car manufacturers exhibiting are Benz, Brewster, Cunningham, Daniels, Duesenberg, Fiat, Hispano-Suiza, Hotchkiss, Isotta Fraschini, Lanchester, Lancia, Mercedes, Minerva, Panhard, Rolls-Royce, Rubay, Sunbeam, Voisin and Winton. Cars exhibited by coach makers are Cadillac, LaFayette, Lincoln, Locomobile, Marmon, Packard and Peerless. Coach exhibitors are Brewster, Brooks Ostruk, DeCausse, Demarest, Fleetwood, Healy, Holbrook, Hume, Judkins, LeBaron, Locke, and Rubay.



A rather unusual frame construction is used on the six-cylinder Hotchkiss. The cross brace stiffens the frame at a point where great stress occurs owing to the spring action. In addition the cross brace supports a bearing on the drive shaft

The shock-absorbing lever on the Hotchkiss. It is not a radius rod, but merely serves to check excessive spring action

What Do We Seek?

To the Editor of MOTOR AGE:

I was there, at the meeting of the Automotive Equipment Association, and I heard Ray Sherman talk at the meeting on Wednesday night at the Medinah temple, in Chicago. To me, and I believe to all of those present, it was a wonderful and profitable evening. The films, "Shop Profits" and "Ask 'Em To Buy" graphically portrayed steps in the successful development of a business, and the lesson they depicted can not fail to produce results. Moreover the speech made by Mr. Sherman was one that held the attention of his audience, with just the right proportion of humorous incidents, making palatable the business ideas he was hammering home.

Then I went home, turned in and went to sleep, and in the night I dreamed. And this is the dream.

I was again at the meeting, and Mr. Sherman had just finished his talk, and the chairman asked me to speak, and I wasn't afraid and spoke.

Chairman, Ladies, Gentlemen, Mr Ray Sherman has presented a subject as I have never heard it presented. He has shown you possibilities before undiscovered. He has brought to your attention the idea that the aim of all of us is to make money, and has also brought out that it is not merely for the increase in a bank deposit, but for the things that financial affluence mean.

But, Gentlemen, in this incentive or aim or object, there is a danger spot that has put rottenness in business, since the time that business began. It is the danger that the desire for gain, increase in assets, or whatever you wish to call it, will take precedence in your thought and my thought, to the point where selfishness predominates and rules out the finer qualities in you and me.

If money were sure to bring real happiness, peace and home, we would all seek it gladly. But is this the case?

Just go to some large department store, to the carriage entrance as it once was called. Watch the women, jewel

bedecked, and fur clad, stepping from their fine cars. Listen to the scathing tones in which the chauffeur is addressed, note the look of worldliness and pessimism, and see if money alone really brings the things it is supposed to do,

But you may say, "Cut out the preaching, on with the game, I have a family to support, bills to pay, and a lot of that stuff called overhead, and I must hustle to get the coin, regardless."

True, of course, but watch your steps and your thoughts. Would you like to have the "Gyp" salesman enter your place of business, and without regard for your needs load you up with a lot of stuff that you never would sell. NO, a thousands times NO. Then apply the same thought to your customers. The salesman who helps you out, is the one that really has your interests at heart and helps himself by helping you. Nor does he push you to the point of buying more than you can easily sell, so that with a quick turn over and good profit you can develop your business. And does the good salesman lose by these methods? NO, is again the answer, and neither will you.

Now enough for the preaching, back to the job, sell to the man that drives up to the gas tank, anything that he really needs, keeping in mind that your real business is supplying the needs of your fellow man.

But, keep also in mind that your real business is to help him, not to load him up. Did this attitude on the part of the good salesman do him any harm? No, it built up your business to the point where his own business prospered. The same thing will come to you. You do not have to lack for comforts, home or happiness, but there is a better way than seeking them first, and that is the way that seeks the good of others. In the long run, or in the short, there will return to you, not only a share of business ample for your needs, but a share of comfort and internal satisfaction, that human plans alone can not supply.

P. A. H.

Franklin Announces Seven New Body Styles for 1923

Four-Door Sedan Latest Addition. Bodies Are Longer, Lower and Roomier. Top Changed on Touring Car

THE 1923 Franklin bodies have lower top lines, increased length and they are wider above the body rail. These changes in construction enabled the designers to effect greater interior roominess. The lines of the higher hood are carried back from the almost vertical grille to the flare of the cowl, where they blend smoothly and naturally with the body lines. The level of the hood line and body rail presents an unbroken and continuous sweep from tip to tip.

The compactness of the new engine has made it possible to provide more space in the driver's compartment and by the additional length of the new bodies, more space has been obtained in the tonneau. A gain in comfort has been attained by the position of the seats, which are lowered and set at a slightly greater angle than before. The steering post is also inclined more acutely.

Six of the seven models will be closed cars. The only strictly open type will

be the touring car. There will also be four body styles: sedan, brougham, touring-limousine and demi-sedan, the most recent member of the Franklin family, the coupe, and the two-door sedan with the V-front.

The cabriolet effect, especially noticeable in the outward flare of the body surfaces from sill to roof, has been worked out on the new closed cars.

The newest type is a sedan with four doors and a straight-type windshield. In the rear compartment the seat for three passengers is roomier and space for luggage increased. A gain in roominess has been made in the front seat by building it straight across and making it lower, wider and set at an angle.

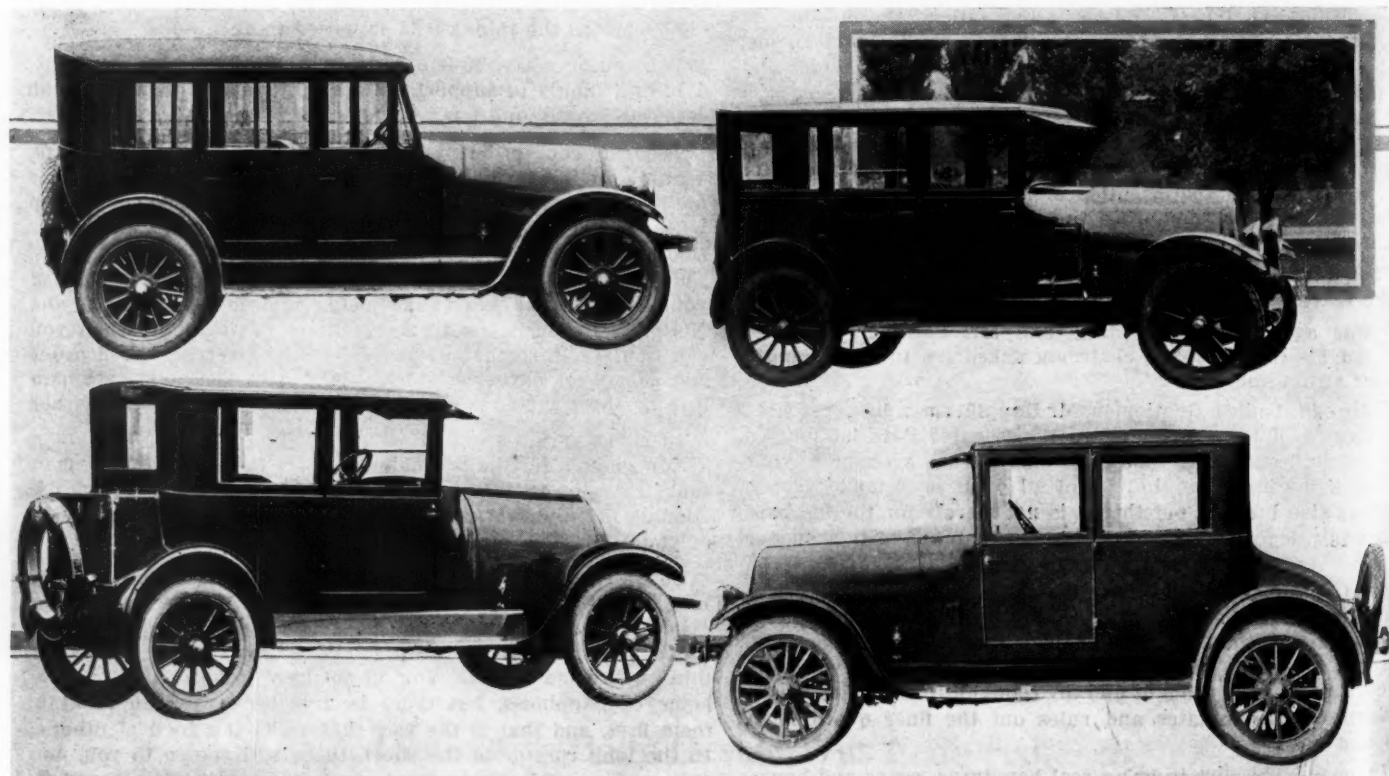
In the new brougham, royal blue is the color selected for the exterior. It will carry five passengers, has two tilting Pullman seats in front and a low comfortable rear seat. A luggage trunk is attached to the rear and set off by

nickel trunk guards. The finishing touch is the tire carrier on the rear.

The coupe's lines have been improved and made more attractive by the lowering and widening of the new bodies and a change in the shape of the rear hamper. The increased length of the body has provided more leg room.

In the new demi-sedan, a pronounced influence of the changes in design is apparent. The roof being lower and wider has improved the appearance. The glass side panels have been increased in area and the change of windshield design gives clear diagonal vision.

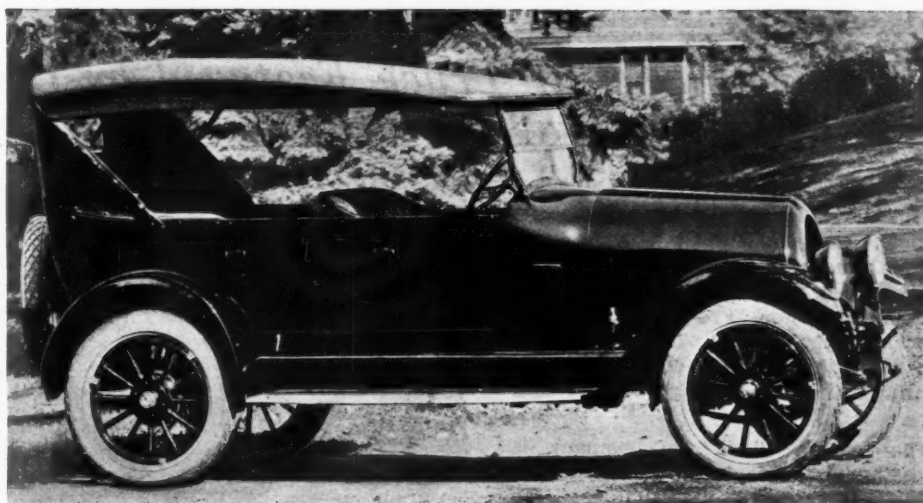
Changes in the touring body are in the construction of the top which affords rear seat passengers an open view. The front seat is wider and there is more room in the front compartment as well as in the tonneau. A rakish look has been attached to the touring by virtue of its low top and the merging of the body rail with the horizontal top line of-



The 1923 Franklin enclosed models include the Demi-Sedan, upper left; the Four-Door Sedan, upper right; the Brougham, lower left; and the Coupe, lower right

the hood. Through an outward flare to the upper half of the windshield, the oblique vision of the driver is improved, and easier driving under storm conditions is possible. This windshield is the new lap-over style, with rain gutters at the sides, very narrow corner pillars, and an improved rubber strip, which makes it weather-tight.

In the arrangement of the new instrument board which is all metal and ebony color, the lighting and ignition controls, battery indicator and spark advance and speedometer and clock, are grouped in three rectangular panels—an arrangement typical of the attention to detail given the new bodies. The mountings and fittings are all Roman in character, being edged with polished duralumin and inlaid with black pyralin enamel.



Touring Series 10

Selden De Luxe Motorbus

Built particularly for interurban and long distance sight-seeing service, the Selden De Luxe model makes an attractive motorbus. It is equipped with a Brown body seating 19 passengers, including the driver.

The unit 31 chassis with 160-in. wheelbase is equipped with an engine which with special gear ratio in the worm drive rear axle gives plenty of speed and yet all necessary power for hard pulls, it is stated. The springs are designed for easy riding and combined with the flexible Selden construction, a bus as easy riding as a passenger automobile is secured, the company states.

The body is 16 ft. 8 in. long back of the driver's seat, 16 ft. 1 in. overall length. It is 66 in. wide inside at the belt line and 72 in. wide overall. The body has a 58 in. height overall.

The exterior panelling is 18 gage Terne plate, and the roof is solid panel covered with heavy white duck, heavily painted. The interior is lined with six dome lights. The tire carrier is under the chassis frame at the rear. Curtains, heaters and collapsible luggage carrier on the rear are provided as equipment.

The windshield is a two-piece slanting type, both sections adjustable, with aluminum visor type rain shield. Win-

dows in the doors are equipped with mechanical lifts operated with crank. The three windows in rear, together with two on side, are stationary. The doors are 28 in. wide, except front ones, which are 24 in. wide. American plate glass is used throughout.

New Indian Motorcycle

A new super powered model, the Indian Big Chief, of 74 cu. in. piston displacement, has been announced by the Hendee Mfg. Co. There seemed to be a demand from those interested in the trade for a machine for side car use, with greater power and speed, but embodying the same engineering principles of the original chief.

The Big Chief 74 has been undergoing development for a year and over 50 of these machines have been plugging good, bad and indifferent roads in all sections of the country since early summer. These were factory production machines, regular stock models and not specially constructed experimental models. The company is pleased at the uniformly good reports from dealers and riders which are coming in every day, attesting to the performances of this new addition to the Indian family. The Indian Big Chief sells for \$345, f.o.b. Springfield, Mass.

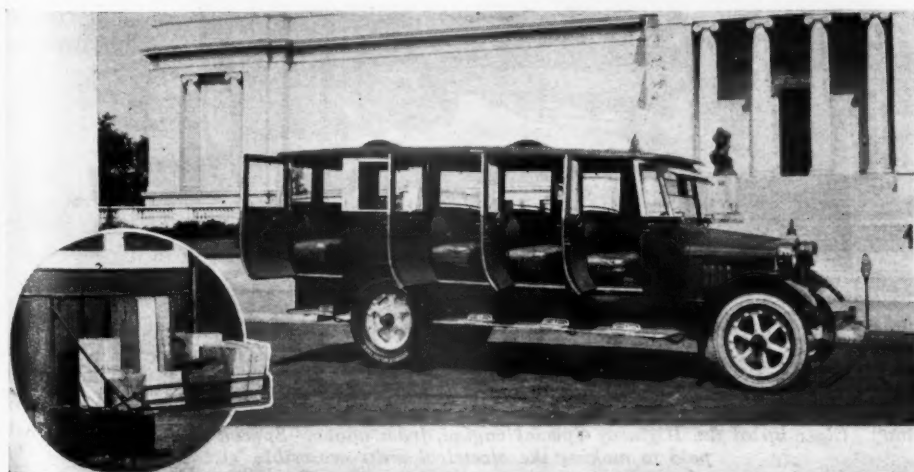
Gardner To Have New Model for 1923

Announcement has just been made of a new Gardner model for 1923 which will be powered with the new Lycoming four cylinder engine, recently described in *MOTOR AGE*. The new engine has a bore of 3 11/16 instead of 3 1/2 in. and will develop considerably more power than the old one, which was also of Lycoming make.

Other features of the new model include an improved carburetor, a 16 in. four blade fan, with bronze bearing and thrust washer, a larger (10 in.) Borg & Beck clutch requiring a pedal pressure of only 25 lbs. as against 45 lbs. on the 1922 model, an emergency brake on the transmission, a spoon type emergency brake lever release, larger and improved service brakes, a heavier rear axle, an improved frame front cross member which makes the timing gears and forward end of engine readily accessible, a heavier frame, improved, anti-rattle hood catches, genuine leather seat ends in addition to leather cushions and backs, door pocket flaps with metal fillers and improved trimming around the doors.

The total brake frictional area on the new model is 200 sq. in. The method of fastening the top back curtain to the body has been improved, and the muffler has been increased in length and set back farther in the chassis, which, together with the fact that the tail pipe extends to the rear, is claimed to ensure more quiet operation of the car. The instrument board has been redesigned and the seats have been made lower and deeper, which adds materially to the riding comfort. There is also more leg room in the front compartment, which is secured by extending the front seat back and moving the dashboard forward.

The new model will be furnished in four body styles, roadster \$965, touring \$965, coupe \$1115 and sedan \$1345 which represent an increase in price of \$70 on the open models and \$20 on the closed.



Highway Special Truck Featured by Low Cost of Chassis

FIRST announcement of the Highway Special truck, a 500-200 lb. capacity vehicle, was made last summer and sample trucks have now been placed in the hands of distributors, the company, the United Motors Products Co., Grand Rapids, Mich., states. The truck sells for \$895, this price including electric lighting and starting equipment and cord tires.

The feature which the company is stressing is the fact that every unit is a high grade truck part and that the Highway Special does not follow passenger car design in any particular.

The truck is adapted to high class delivery service when equipped with the panel body, which is of pleasing lines and attractive finish and is also supplied from the factory with canopy stake and express bodies, which have been standardized for this job.

The engine is a special Herschell-Spillman, having a bore of $3\frac{1}{2}$ in. and a stroke of 5 in. The electrical equipment is the latest type Bosch system.

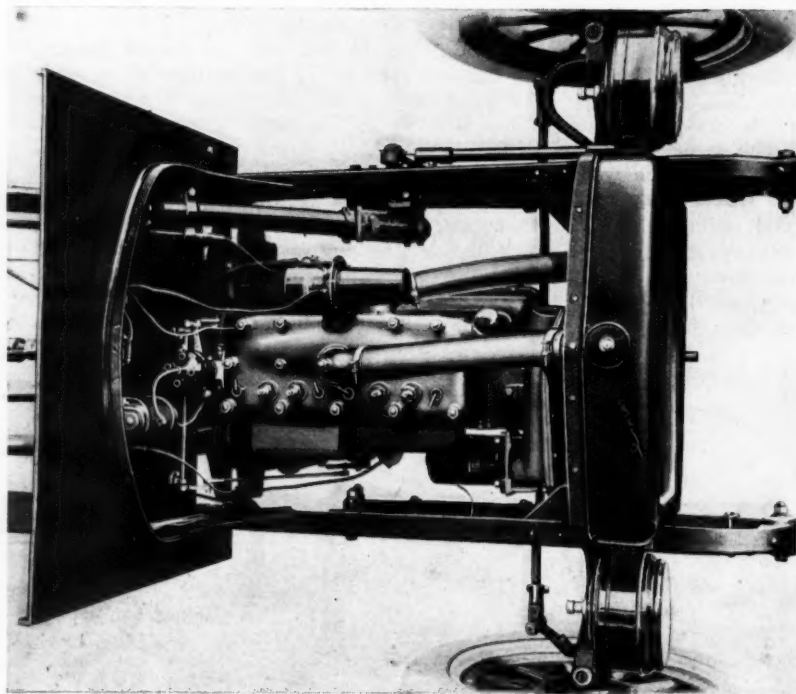
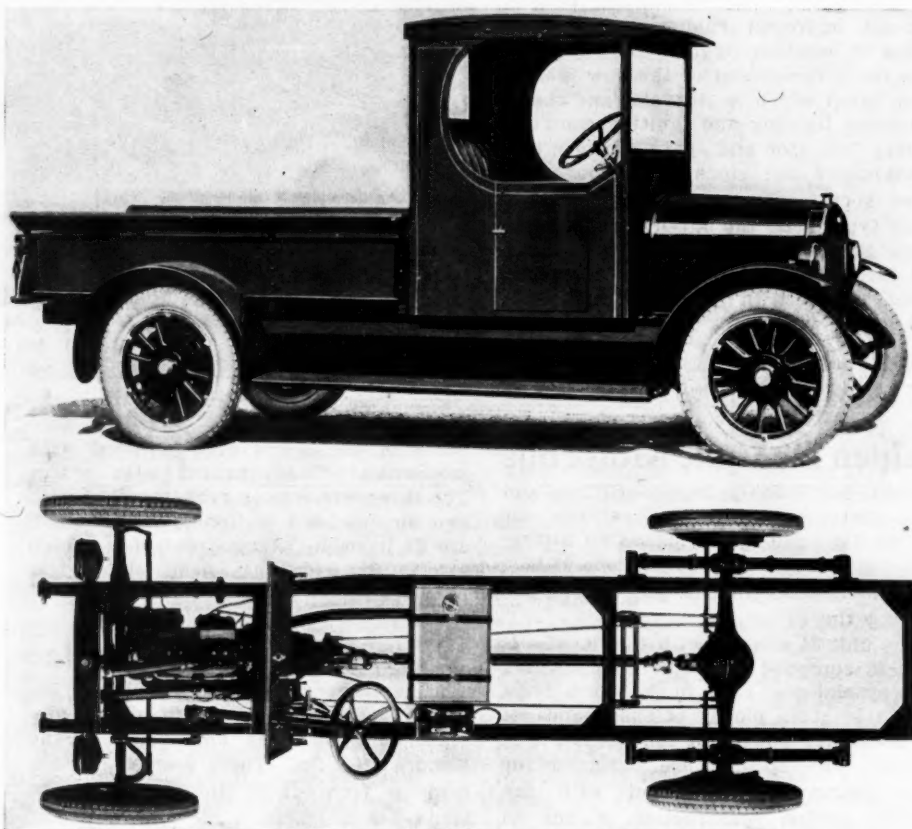
The cooling system includes a baked enamel, heavy pressed steel shell radiator with removable core and tanks. Special attention has been given in mounting to prevent vibration and road shocks on the core. A Zenith improved jet type carburetor is used with gravity feed from 15 gal. tank located under the seat. The clutch and transmission is a Fuller unit power plant.

The rear axle is a Columbia spiral bevel type with one-piece pressed steel housing, 5-8 to 1 ratio. Drive is taken by single Spicer propeller shaft of $2\frac{1}{2}$ in. diameter tubing with two universals. Both brakes operate on drums on rear wheels, having $16\frac{1}{2}$ in. drum.

The frame is of pressed steel construction $4\frac{5}{8}$ in. deep, with $3\frac{1}{2}$ in. flange at center. The distance from back of driver's seat to end of frame is 92 in., with 128 in. wheelbase. The steering gear is a Lavine through worm and nut type, with accessible adjustments for all wear. Springs are of the semi-elliptic type, chrome vanadium steel, the front having eight plates $2\frac{1}{4}$ in. wide by $36\frac{1}{4}$ in. long. The rear springs have ten plates $2\frac{1}{4}$ in. wide by $46\frac{3}{4}$ in. long. Both the drive and torque are taken by the rear springs.

The wheels are wood artillery type with Firestone rims and $32 \times 4\frac{1}{2}$ tires. Standard equipment includes complete set of tools, hand tire pump, jack and electric horn.

Standard colors are black running gear with united green wheels. The company is prepared to furnish all types of bodies and special attention has been given to high-class body equipment for the highest class delivery service.



Above: United Highway Special truck with express body and cab. It is equally well suited to other body styles

Center: Top view of the chassis, showing the rather accessible units.
Below: Close-up of the Highway Special engine, from above. Special attention has been paid to making the electrical units accessible

What the Small Dealer Can Learn From the American Automobile Co.

Many of the Things Done by a Concern Selling a \$5250 Car Can Be Done Equally Well by a Concern Selling a \$500 Car

By B. M. IKERT

THIS publication has repeatedly pointed out that there are many things which the small town dealer can learn from his fellow dealer who operates in the large city. In the December 7 issue of MOTOR AGE we told of some of the things which the American Automobile Co. of Milwaukee, distributor of Pierce-Arrow cars, does to make its business a success.

By this time the Runwell dealer who sells a \$1000 car out in Prairietown has said to himself, after reading this story:

"That's perfectly all right for a bird to do who sells a \$5250 car, but where would I get off doing those things with a \$1000 Runwell?"

The man has said exactly what we thought he would. The trouble has been that too many dealers have worried about where they would get off if they took some lessons from the successful dealers of larger cities. There is every reason to believe the small town dealer can do many of the things which his fellow dealer in the large city does to make maintenance pay. It's being done.

Some of the most successful dealers we have today are located in very small towns and they are doing on a reduced scale what the successful dealers are doing in the larger communities. Size of institutions does not count. If you think so, just recall that in the larger cities particularly some of the most successful candy stores are hardly more than 15 feet square.

These generally are conducted under the name of Mrs. So and So's Candy and the thing which impresses you is the neatness and daintiness with which these small stores are laid out and operated. What has that got to do with selling and maintaining automobiles? A whole lot.

Because the public likes certain things about these places and misses them sadly in other lines of business, like the selling of maintenance in many establishments. Understand, we don't expect the dealer to put in a candy counter or a soda fountain. But we do think he can learn from these candy kitchens and ultimately be doing just what the American Automobile Co. is doing in Milwaukee.

If you ask people what impresses them about the small candy stores mentioned

above they generally say things like this:

"They are so neat and clean."

"The clerks are pleasant."

"The places are so well organized."

"The stuff is well displayed and makes you feel like buying."

You can switch these sayings around a bit and see how they apply to the American Automobile Co.'s business and then how it is possible to link them up with the small town dealer's establishment.

Take the one about neatness and cleanliness. Here's a line or two from the story in the December 7 issue of MOTOR AGE regarding the American Automobile Co.:

"This is the first place I have ever seen where the back of the building looked as clean as the front part . . . everywhere you go about this place you are impressed with the neatness and orderliness."

And the clerks being pleasant, here is what was said about the Milwaukee institution:

"The telephone operator is certainly on to her job . . . she was anxious to please the party making the call, as could be told by the tone of her voice and the suggestions she kindly volunteered . . . mechanics talked friendly to the shop foreman and vice versa . . . the same spirit existed between customers and executives."

Now we come to the one "The places are so well organized." About the Milwaukee institution we said this among other things:

"Everything is done according to a well defined plan . . . there is a place for everything . . . when 5 o'clock comes everything is in its place and the shop appears as though there had been a holiday period declared . . . the building is designed and built for the best possible arrangement for selling cars and trucks and their maintenance."

Now about the stock in the candy stores being well displayed and making you feel like buying. In a sense this is another way of expressing confidence in the establishment. About the American Automobile Co. we had this to say:

"We find maintenance facilities in this organization that rival the sales facilities

. . . to present to its patrons a well groomed place of business and to keep everything in harmony with the dignity of the car sold, you can readily see why it is possible to grow enthusiastic over this organization."

Now let's see where the small town dealer can perhaps take some valuable lessons from what has gone before, particularly as regards some of the practices of the American Automobile Co.

One of the first things to consider, which is within the power of every dealer in this country, large or small, is the ever important item of cleanliness. We have mentioned this so much in these columns that many of our readers by this time probably are beginning to believe we must be trying to push sales for Old Dutch Cleanser or Bon Ami. We're not. But just the same, if more cleanser were used by the small town dealer's shop, a lot more of these dealers would be making more money.

A. F. Raffauf, general manager of the American Automobile Co., said this, speaking of the cleanliness and orderliness of his place of business:

"A housewife doesn't clean house only once. She keeps at it all the time. You have to do the same in the automobile business."

Now why is it that some shop foremen, let us say, who have a child at home, tell that child to pick up the toys on the floor before it goes to bed and yet let men in the shop throw tools around the floor and leave them there day in and day out?

You will recall that in the American Automobile Co.'s shop there is a rule that no tool must lie on the floor. This does not mean, of course, that a mechanic cannot momentarily rest a tool on the floor while working on a car or truck, but it does mean that when he goes home at night or when a job is finished there will be only a clean floor in sight, all tools having been neatly tucked away in racks or drawers intended especially for them.

Now, usually there is one man in the average small town dealer's shop who is pretty handy with carpenter tools and the dealer who is ready to spend just a little money can use this man to advantage. It will not take a handy man

long to build some tool cabinets and racks, a new bench and small trucks for parts that come off the cars. But let the dealer spend just a little bit more money and buy a gallon of gray paint so that all these things can be painted neatly.

You will be surprised at the good effects which can be obtained by applying paint properly to such fixtures. Especially is this true if the walls of the shop or service station are painted a similar gray, or whatever color desired. Unpainted wood looks unfinished and good carpenter work often is not appreciated to its fullest extent because of this. So, if you are going to set a man busy making shop furniture, by all means paint it. All the racks and benches in the American Automobile Co's shop are painted, and this, with the prevailing neatness all around, certainly helps to create a good atmosphere.

The American Automobile Co. sets aside Saturday for scrubbing the bench tops. How many of our small town shops ever think of scrubbing the tops of the work benches? Very few. Yet it is one of the easiest things in the world to do.

Often we have gone into a small town shop to find a mechanic or helper sitting around because "there ain't nothin' to do," as he might say. Nor is it always the mechanic's fault. You often find a dealer who will say, "Why should I spend money for all this; nobody will appreciate it; business isn't so good, anyway."

The answer to this is, to go and ask the man who has done it. It is human to shun the restaurant which has poor equipment and a dirty table cloth. It is human to shun the service station which has poor equipment, looks messy and which has such a grimy floor that one is in danger of breaking one's neck while walking upon it, to say nothing of ruining the appearance of his running boards and floor boards after he gets back into his car.

So, we say again, if you are a small town dealer, read again the story "Where Maintenance Rivals Sales" and then CLEAN UP.

Let's go back to the statement in connection with the candy store, "The clerks are pleasant."

We seem to be getting a better personnel in the maintenance stations of the country. The men who meet the public are of a higher type. We do not wish to insinuate that if a man wears overalls he is not a high grade fellow. A mechanic may be covered from head to foot with grease and still tip his cap to a woman customer when she drives away.

In connection with the story of the American Automobile Co., we told of the courteous treatment we received over the telephone from the operator who tried her best to sell the institution to you. She evidently takes considerable pride in the establishment; is proud to be a part of it and knows that, as the business prospers so also is she likely to prosper.

Courtesy on the part of employees and executives in their dealings with the public and amongst themselves builds a wonderful morale and it is this morale which inspires confidence in an institution from the time you call up and a friendly voice greets you at the other end of the line until you pay your bill at the cashier's window and are sent away with a cordial "thank you." Simple little things. And best of all they don't add a cent to your overhead. Wonderful assets to have and while they are not tangible like a cylinder regrinder, they are infinitely worth while. The regrinder will itself become more valuable through such assets because of the good will built up towards the institution.

So take a lesson from this Milwaukee concern and be pleasant and see that everyone in your organization is the same towards customers and their fellow workers. The dividends are big, if you do.

We said something about the candy stores being well organized and the stuff being displayed so you feel like buying. Here's how we might apply this to the selling of maintenance:

Take another look at the reproductions of the photographs showing the various

departments of the American Automobile Co. and we feel sure you will get what we mean. They speak for themselves. Then look around at your own establishment and see how close you come to them in the way of cleanliness and presentation of what you have to sell. One man who made a trip through the concern's establishment said "It makes one feel like buying a Pierce-Arrow just to take advantage of the service facilities you have." What better recommendation could be desired?

To quote from the article "Where Maintenance Rivals Sales;"

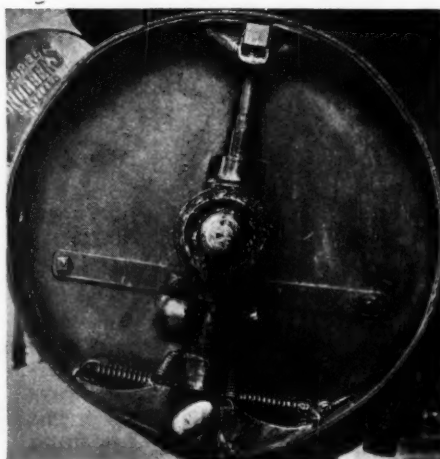
"The basement of the American Automobile Co., rivals the salesroom and shop for cleanliness and excellent handling of details. For instance there is in the basement a neat parts rack which houses what the company calls "junk." Ordinarily this sort of stuff would be relegated to the junk pile somewhere in the shop. But this company feels that inasmuch as there are many Pierce-Arrow cars of ancient vintage still in operation in the state of Wisconsin, there might come a time when the owner of one of these cars would need just such a part. Therefore the parts are cleaned of rust and otherwise carefully prepared for storage in the bins and racks. In fact this parts stock of junk is kept as neat as the new parts stock of many dealers."

We wish it were possible for every small town dealer (and a lot of big town dealers, too for that matter) to take a trip through the establishment of the American Automobile Co. We know they would come out resolved to make their own places more inviting and to do some of the things which have helped make this institution a success. Best of all, the things which this company does are simply those common-every-day things which any of us can do. There is no secret about the company's success, nor about its well organized and kept institution. It's just applying old principles of good business to the selling and maintenance of motor cars and trucks. Any dealer can do the same.

Safety Front Wheel Brakes for All Makes of Axles

One of the more recent developments in the automotive field is the front wheel brake built by the Green Engineering Co., Dayton, Ohio.

This brake acts from the foot brake pedal simultaneously with the rear service brakes and independent of the rear emergency brake. The brake is simple in construction and can be applied equally as well to an old car as to a new one. The brake shown in the illustration is applied to a Timken front axle but can be applied to axles of other makes as well.



The regular spindle bolt is replaced with one of extra length. The upper end is extended to nearly the top of the brake drum where it supports the brake anchor. The brake band is of the internal type with the anchor at the top and the operating cam at the bottom. The operating cam is cylindrical with rounded ends and the center of the cylinder is directly under the center of the spindle bolt so that the front wheels can be turned without changing the relation of the cam and brake band.

The cam is operated by a shaft to which it is attached, and a lever. The two levers are connected by means of a cable through equalizing pulleys to the main brake shaft which is operated by the foot pedal.

What to Do When the Doors Get Loose or Stick

Some Sidelights on Maintenance Matters Concerning Body Details With Which Many Shops Are Not Familiar

By JAMES FERGUSON

THERE is no other part of the automobile body that is used so constantly or subjected to so much abuse as the door, and there is no other part that is more necessary to have functioning right.

Body builders' work is limited by the necessity of meeting the public demand for large doors, giving commodious entrance, light weight, moderate prices. It is not understood sufficiently, that the door is a source of fundamental weakness in the body, the cutout necessary for the doorway permits of that much additional leeway for the strains and twists that are the daily life experience of the car.

Then too, the size of the doors is greater than formerly, and this additional weight is an extra tax on the hinges and lock, so that it is understandable that the proper functioning of the door is dependent on the care with which it is used and occasional inspection of the working parts and lubrication of the hinge pins and the lock bolt.

Door troubles, like bodily ills, display distress signals, in the form of rattles or squeaks, calling attention that they need a tonic, and attention in time is common sense practice. The how and where is here briefly explained.

It should be understood at the start that the bodybuilder makes the doors sufficiently strong, both as to the wood framing and the panel work. Even the very cheapest bodies are constructed with sufficient thickness in framing material to insure service, the weakness is entirely in inefficient assembling of the doors in the body, and when troubles occur prematurely, it is to this cause that the fault can be traced.

For the purpose of making clear the description of troubles as they appear at different points, the various illustrations of sections of the door and body are presented. Of primary importance in door assembling, or door hanging as it is termed in the shop, is the matter of hinges. It is common practice to use the concealed hinge for open body and the exposed hinge for closed body doors. On the former, the concealed hinge gives a smooth surface to the body side, and on the latter the exposed hinge is used because it permits the use of a narrower pillar for fastening same on body.

It should be kept in mind by every repair man, that all hinges used are commercial articles, and in case of breakage, any hinge can be purchased from the hardware manufacturer or a local dealer

or bodybuilder at a reasonable price. Any repair man who has repeated calls for hinge replacements, should have hardware manufacturers' catalogs, buy from their representatives and get these articles at a fair price.

When replacing a hinge that has been broken, it is necessary to do more than merely put in the screws and fasten, care should be taken to insure that all the hinge centers are in line. In fig. 1 a line is shown drawn through the hinge centers. It is necessary to make this check on the two sides, one as shown and the other at 90 degrees from this, in this way you will be sure that the door will swing freely and there will be no undue wear on any one pin.

If these pins are not in line, the pin

that is out of center alignment will be forced up and out as the door is used, and though the pin be driven back in, it will again creep up and stay about $\frac{1}{4}$ in. above the hinge. In time, the moving part of the hinge will wear a notch in the pin in its effort to effect a true alignment.

On open bodies there are but two hinges, thus the troubles are less in this respect, also the pins are integral with the hinge and being thus rigidly held, the alignment while not less important, is slightly less liable to be troublesome than with the outside hinge. The method of lining up the outside hinge is with a straight edge, having the door off and using markers in the holes.

Another point to remember, is that the

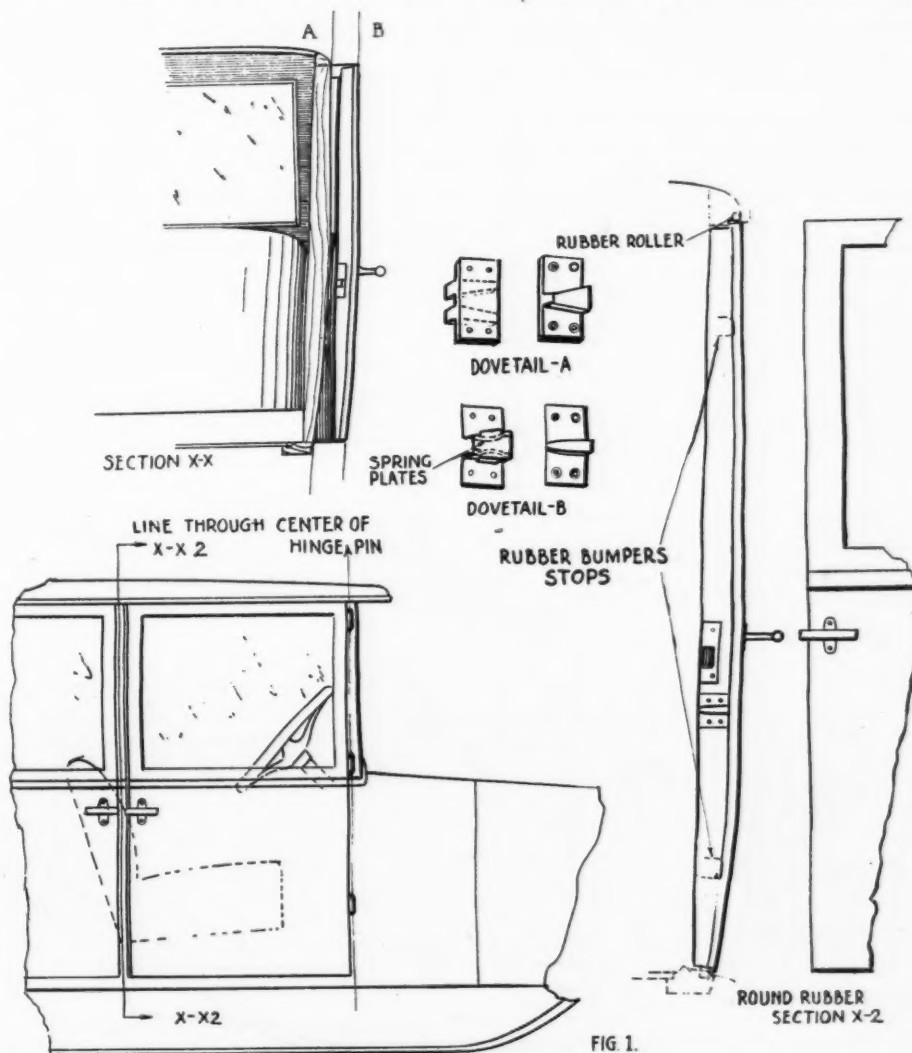


FIG. 1.
Door structure details, showing the types of dovetails used to always insure a door closing properly. In section X-2 is shown a rubber roller at the top and a rubber bumper at the bottom

door, when open, should stay so. This is provided by having the hinge line so that the door drops slightly as it is opened. Doors are hinged, locks fitted and completely assembled when the body is made and before attaching to the chassis frame. During the latter operation considerable distortion to the body can be made, when fastening the body bolts, and doors that work perfectly on the straight set up frame in the body shop can barely be made to open and close when mounted on the chassis.

Every assembly man knows how to shim up the body sill to overcome this trouble, in time however, these shims become loose or drop out entirely. When this occurs and the door is slammed hard, if there are dovetails of the rigid type used, the door is strained to make engagement. The result is that the hinges have to give at their fastenings, and in a short time they give trouble. Either the hinge must break or the screws come out, as the leverage exerted by making engagement at the front is too powerful for the hinge fastening to withstand.

The use of dovetails has been a much debated subject ever since the first bodies were built. Different forms have been used to overcome inherent defects but the two illustrations, dovetail A and B, are sufficient for the purpose of describing their use and their relation to door troubles.

Dovetail A is the earlier form used. Its engagement is positive, and it does not require any knowledge of body-building to realize that, provided the door sags due to the body frame being distorted on the chassis, so that the door when closing, is low or hangs down at the lock side, a slam will force the dovetail to engage, thus raising the door at this side, and straining the lower and middle hinge, fig. 1. As the car is used, this drag on the hinges is continuous until the fastenings of the hinge eventually release their hold.

Dovetail B has a compensating spring and rubber cushion, to function when the strain is excessive. There is a continuous oscillating up and down motion at the lock side of the door all the time that the car is in motion and there is a positive need of some cushion, elastic in principle, to assist the door to maintain a near set relation at this side, yet the strain on the hinges must be less than a drag.

In Section X-2 is shown a rubber roller at the top and a rubber bumper at the bottom, as well as the dovetail B. It is the writer's opinion however, that the dovetail is best left off and reliance be placed on top and bottom bumpers alone. A door should be held lightly at the lock side, the rubber bumper stops can engage slightly as shown, but the alignment of the door is only rightly provided for by having the hinges bring the lock side into its right position and not strain or hold it artificially by dovetails of any sort.

Good hinges, heavy enough for their work and if necessary an additional hinge, four are used by the Hudson, although three is the customary number, is the best plan to insure a long lived door.

One other feature that used to be considered necessary in carriage days that is not given the importance that it deserves, is the door twist. Fig. 2 shows side, top and cross section views of an open body. Looking at the top view, it will be noted that the door is partly open. On the cross section Y-Y, there are two imaginary lines drawn through the door touching at the top and bottom and also through corresponding points on the body.

Now, although these lines A and B are drawn through points that meet evenly when the door is closed, these two lines are not parallel. They are wider apart at the top, whereas on section X-X Fig. 1, which is a corresponding view of the closed body, the same lines are wider

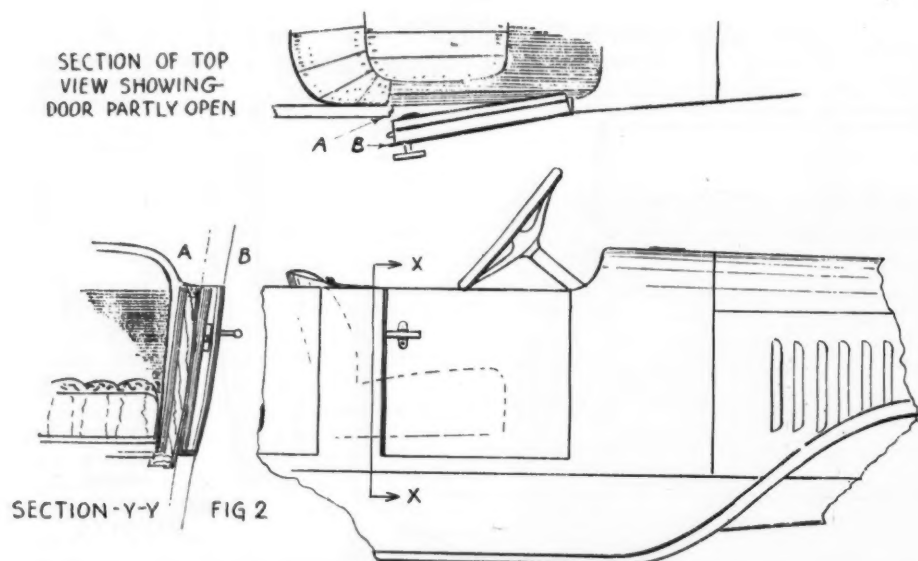
apart at the bottom. This rule was followed on carriages and is still used by high grade body builders to create a strain or twist in the door, so that the point of the door farthest from the lock, will shut first, and the lock bolt engage. The slight strain holds the door fast.

It is just as easy to consider these features when making repairs as to ignore them. There will be far more satisfaction and permanency to the job, if consideration is given to the line up and hang of the door, the lost or broken part is merely reinforced and the job allowed go at that, because, unless the breakage has been caused by an accident, the need for making a replacement is probably due to some of the reasons mentioned.

The lock of a door fulfills a very important function, we all probably ascribe to it the importance that it merits, because it is so much in evidence. There is just one rule that should be always considered in relation to the lock and that is have a good one. The best are the cheapest in the long run, and trouble enough will be experienced as the car ages even if the best article that can be purchased is used, because the strains, jolts and constant movement of the door when the car is in motion, have their effect on the lock springs and moving parts.

The life of the lock, whatever it may cost, is contingent on the proper adjustment of the striker to which it engages. In Fig. 3 are several sectional views, showing how the two parts, the lock bolt and the striker, should engage and also examples of wrong engagement. The lock bolt is made of steel and the face that engages with the striker is hardened to preserve it. The striker, which only costs a few cents, is made of soft metal, such as grey iron, bronze or sometimes of fibre. Strikers are intended to be filed and refitted from time to time and they are assembled in such a way that readjustment is easily made.

In the body section, Fig. 3, the sectional views Z and W, show the two faces that form the shut bevel of the door and body. The cross section U-U shows how these faces are joined, and the proper way for the lock bolt and striker to engage. Views O and P show the same relative position of parts as U, except here are shown two incorrect ways of fitting the striker to the lock bolt. The one shown at O is a very common fault. It can readily be seen that the point of the striker alone touches the lock bolt face, this not only means that the striker will be worn away quickly, and then the door will rattle, but also that the wear that will come on the bolt will be at one place, instead of being distributed over the whole. Ordinarily in such a case, when the door rattles due to this quick wearing away of the striker, the repair man will simply add more rubber bumper, then the door overlap will show more opening than intended. As shown at P, this rarely happens as the bolt



Side, top and cross-section views of a door on an open body. Although the lines A and B are drawn through points that meet evenly when the door is closed, they are not parallel. This produces a slight strain, which holds the door fast

tends to loosen and the fault is corrected in time.

To test whether the striker face is true with the bolt, place a little thick white lead on the point of the bolt, first drawing back and holding firmly with the handle and press the door closed. Then release the bolt, allowing it to go home and, still firmly pressing the door closed, withdraw the bolt, pulling it straight back and not allowing it to drag.

If the engagement is as should be, there will be a misty film of the lead over the entire striker face. If the engagement is at one place only, the lead will either be deposited thickly at the low spots or it may be perfectly clean. Either is an indication that the bolt face does not engage evenly over its possible bearing surface. This is an important matter and should be corrected until full engagement takes place.

There is still another point that requires attention, in relation to the bolt and striker. That is to make sure that there is ample clearance in the wood beyond the end of the bolt. Looking at section U-U as well as the two views O and P, this clearance is seen as the black portion. This should be ample, because if the bolt should bottom before being fully extended the result will be that the handle will not be rigidly held, and this should not be allowed to pass without inspection.

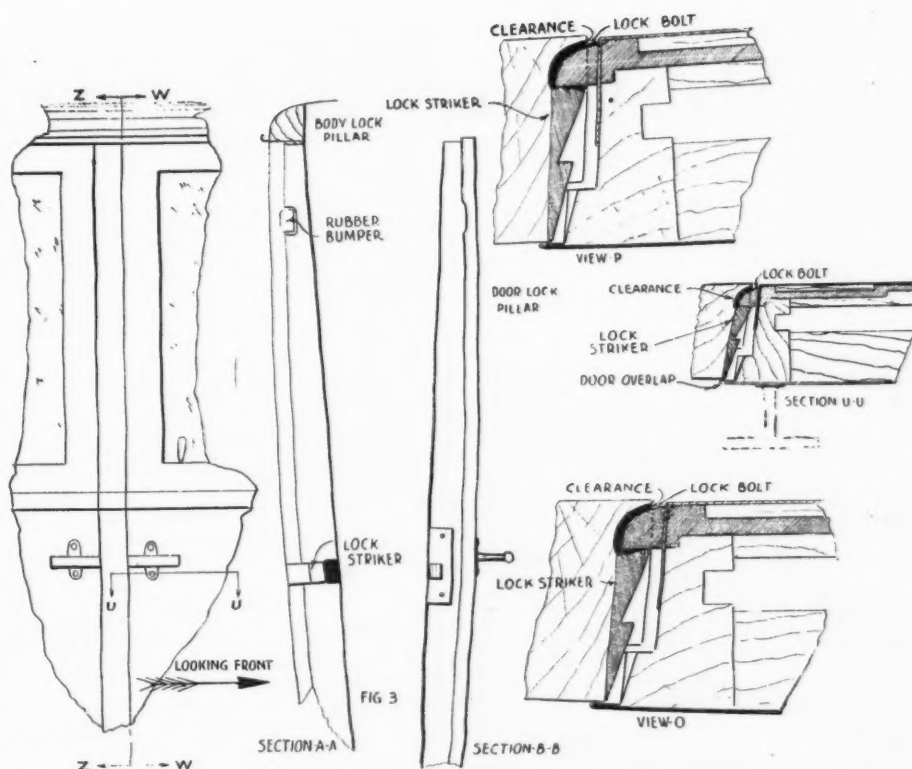
The few rules thus briefly outlined are not sufficient to enable a newcomer to pass on the entire fitness of a door, but they will be sufficient to guide any person that has had the least experience with doors, to start right in giving instructions and to know if all the requirements have been met when a repair has been made.

The rules in condensed form are:

First—Move the door to and fro and consider the hinges, see if pins work out, if so test the line of pin centers with a straight edge.

Second—See that the door stays open. It will do this only when the door drops a little below the horizontal when open.

Third—See if there is a slight twist in the door as shown by A-B lines.



Several sectional views showing how the lock bolt and striker should engage. Strikers must be refiled from time to time and usually are made readily removable

Fourth—Close the door slowly and see if the hinges bring the bolt and striker into engagement without the forcing up by the dovetail. If the dovetail does not engage easily, remove one member and try door without. If line up is not even, which can be detected by the mouldings or some other comparative parts not lining, add paper shim to hinge on body until perfect engagement is obtained.

Fifth—Close the door, test it for rattles, hold hand to glass to keep any rattles at this place from confusing the point under consideration. If the door rattles, either there is not enough bumper or else the striker is not set in far enough. To determine this, look at the clearance between the overlap or the moulding, whichever may be on the door, and the body panel. If this strikes the


body and shows a mark on the paint, more rubber bumper is required. If the clearance is excessive, say, more than a scant $\frac{1}{8}$ in., then the striker should be moved in. This can be done by removing the screws, plugging the old screw holes and setting the striker back and further in, using smaller screws, until the right place by tryout has been determined.

Next, test the fit of the striker face and the lock bolt face by using white lead as explained earlier in this article and file striker face, if necessary, until the correct angle of face is obtained. Emery the striker face perfectly smooth and place a little oil on it and on the bolt. A little on the hinge pins is also a good thing, but not absolutely essential.

A Gift Certificate

On the well known night before Christmas, how many of the people in your community will be giving gifts that were bought from you? While the time is still very short, may we not suggest that you still have time to get in on a good big share of the money spent. Reproduced here is a Christmas service certificate issued by the Black and Decker Co. for their dealers to use in selling service for a Christmas present.

While you may not have time to have some of these printed or order them from your jobber, still you can sell service, giving a letter, typewritten stating not any more than just what is shown on this card and making it redeemable in service only. Try this on the next customer that comes in.

		CHRISTMAS SERVICE PRESENT	
		Merry Christmas	
TO _____		FROM _____	
UPON PRESENTATION OF THIS CARD AT _____			
ANYTIME DURING THE YEAR _____		SHOW DETAILS HERE _____	
YOU ARE ENTITLED TO RECEIVE THE _____		_____	
FOLLOWING SERVICE ON _____		_____	
CAR FREE OF CHARGE.		_____	
RECEIVED PAYMENT FOR THE ABOVE _____		SIGNATURE OF DEALER _____	

Maintaining the Exterior of the Car

*Repainting, Enamelling, Electro-Plating and Trimming
Constitute a Profitable Branch of Automotive Maintenance*



The clean exterior of the company's place of business invites confidence on the part of the customer

Painting and trimming maintenance for automobiles has recently begun to receive the same attention which has been devoted to other phases of the industry.

In view of the new interest and development, the plant of the Louisville Painting and Trimming Co. is of interest as representative of the most modern and efficient equipment and methods.

The new plant, of this company, where thirty men are employed, is of one story concrete construction, having a clear span without posts and monitor type roof to give maximum light and ventilation. The walls were set inside of the property line so that no other building would cut off the light. A driveway from the street runs along one side of the building to a rear court yard where the cars are received and checked before they are brought inside.

The work to be done is written up on two forms, one of which remains in the office as a permanent record while the other goes into a celluloid covered pocket which is hung on the car. The latter gives the workmen complete instructions as to just what is to be done. An acknowledgment is also written up on a form and mailed to customers to avoid any argument later when the car is delivered.

Each car carries a job number and each workman turns in a time ticket at the end of the day showing the job number and time he has spent on it. This time is entered on the office record daily

so that an accurate cost is kept on each job and each workman can be checked as to the amount of time he has put in on the given operation.

All work is brought into the shop from the rear court yard where it is disassembled or knocked down, that is lamps, fenders and similar parts are removed. If the car is equipped with wire wheels, it is trucked and the wheels removed.

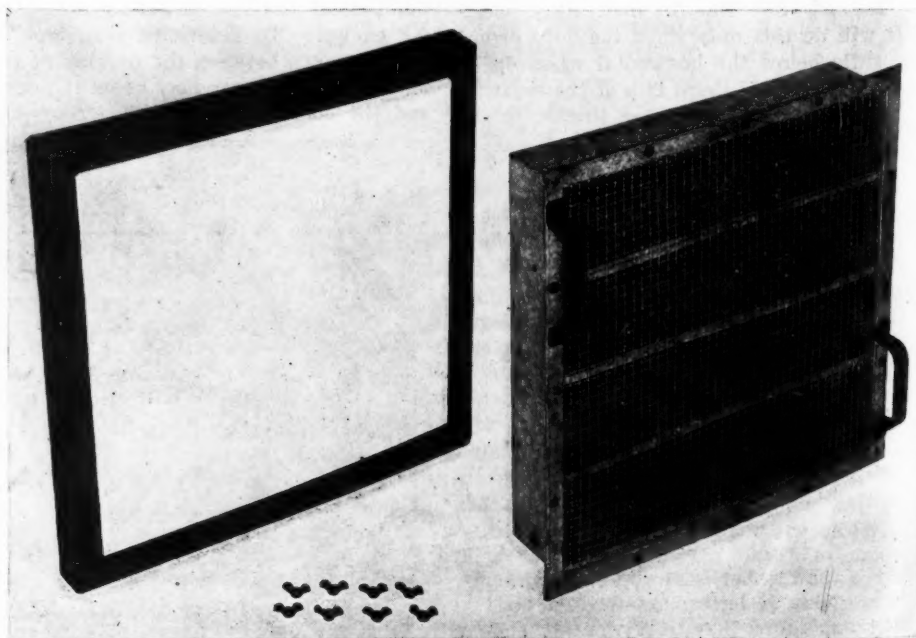
The car is then sent to the cleaning rack, all enameling parts to the enameling room and nickel plated parts to the plating department. Each part carries the same number as the car so that there is no mix up of parts belonging to different cars.

All the paint is removed from the car by hot alkali which is brought to boiling temperature in a special machine designed for that purpose. As the body is being cleaned the hot solution runs down over the springs and axles, effectively removing all grease from them.

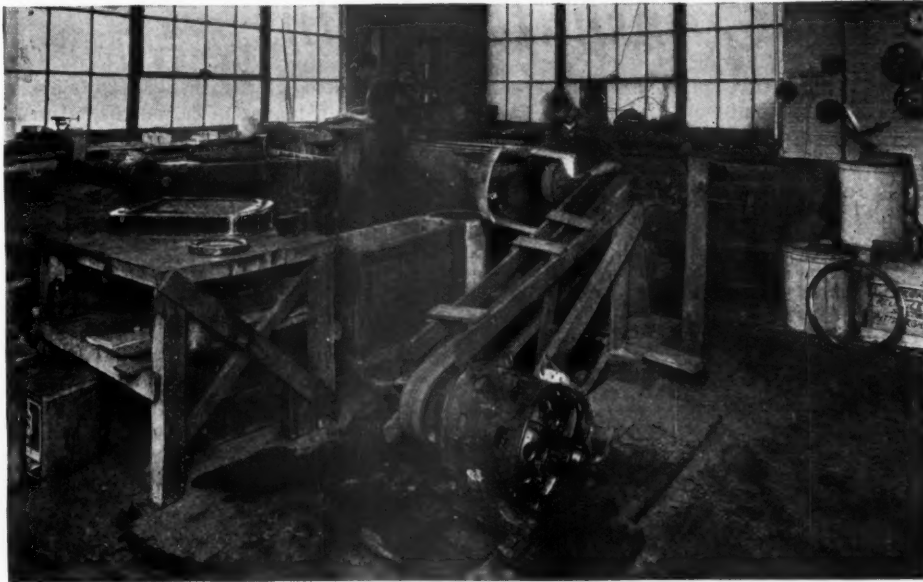
The car then moves forward through various stages of painting, until it has reached the front of the shop where it is ready to go into the finishing room for the last coat of varnish.

The finishing room is practically airtight and is equipped with a forced ventilating system. All dust is removed from the air by means of an air filter which was developed and patented by the company. This forced ventilation not only improves the conditions in the finishing room but greatly hastens the drying so that it is possible to deliver a car the day after it is finished. The day after the last coat of varnish is applied, the car is assembled, inspected and is ready for delivery.

The enameling room is equipped with a battery of baking ovens, drain boards



The finishing room, which is practically airtight, is equipped with air filters, as shown above. Forced ventilation not only cleans the air but hastens the drying processes



A view in the plating room. Here radiator shells, lamps and bumpers are copper plated or nickel plated

and flowing machine. Instead of dipping fenders, which is the usual method they are placed on a drain board and the enamel is applied by means of a hose and nozzle through which the material is pumped. In this way only a small amount of material is in use at a time and the work comes out much cleaner. For a large factory production the dipping process is much faster, but in a custom shop where most of the fenders have been used and would naturally have dirt in the seams, a dip tank soon becomes dirty and the finished work consequently comes out imperfect.

All wire wheels are handled in the enameling room. They are painted by means of spray machines working under

a hood and fan to exhaust the fumes and are then baked out in the ovens. Old enamel is removed from parts in iron tanks which are filled with an alkali solution and brought to a boiling temperature by means of gas burners underneath.

The electro-plating department is fully equipped to copper and nickel plate all automobile parts such as lamp rims, hub caps, bumpers and radiator shells. This department might be considered by some as outside the automobile painting field, but nearly everyone now wants the trimmings on a car nickel plated when the car is repainted. It is no end of trouble to be continually sending parts out and getting them back at the right

time. Very often some of the small parts are lost when this work is sent out, which causes considerable inconvenience.

A complete trimming and upholstering department is maintained where anything in this line is taken care of before the last coat of varnish is put on, so that it will not be marred by the trimmers after it is finished. In this department, tops, seat covers, curtains and carpets are manufactured and this is found to be a very profitable end of the business.

The whole idea of this plant is the re-finishing of automobiles in a minimum of time consistent with high quality work. The work enters the shop at the rear and is delivered at the front so that it is moving in only one direction through the shop.

Materials are carefully selected and tested on panels in the weather for durability. By buying in large quantities the best prices are obtainable.

The average time required to turn out a first class job from the metal up is twenty-one working days. A large amount of the business is derived from painting and trimming used cars for dealers, which work is handled at a very close price. This gives the shop a large volume of business to draw on and allows the dealer to put a used car in presentable shape at a minimum cost.

This company handles all the business of 75 per cent of the local automobile dealers, who are all boosters in recommending the firm to their customers. The dealers' work is always given first consideration as to service. Without the dealers' support this business could not prosper to the extent it has. The owners realize that the good will of the automobile dealer is held through quality work, fair prices and real service.

23 Years Ago This Week In Motor Age

(From MOTOR AGE of Dec. 14, 1899.)

Auto-Truck Tested

The Auto-Truck Co. has tested its first truck. The vehicle is 16 feet long and weighs eight tons, and is designed to carry a load of 10 tons. The air engine is rated at 100 horse power and it is claimed that enough compressed air is carried to last 15 hours.

Lozier Making Motors

A company for the manufacture of automobiles and launches of all kinds will soon be organized, says the Cleveland Leader. E. R. Lozier and George Burrell are at the bottom of the project. The launches and the automobiles will, for the present time, be made at the Lozier bicycle works in Toledo. Mr. Lozier has for a long time been experimenting on making automobiles.

A Milwaukee Concern

MILWAUKEE, Wis., Dec. 11—The Milwaukee Automobile Co., with a capital stock of \$100,000, was incorporated a few

days ago, the incorporators being W. H. Starkweather, formerly of the Milwaukee Engineering Co., which has passed into the American Bicycle Co., W. G. Smith and Herman Pfeil.

Notes of Interest

Philadelphia boasts the first exclusive motor-cab service for a hotel. The Lafayette hotel of that city has arranged with the Pennsylvania Vehicle Co. for cabs that will be held for the exclusive use of the patrons of the hotel and will bear the name of the hotel on the vehicle.

Fire Chief Croker of New York has been refused the privilege of running his steam auto through Central Park. "Too noisy," said Commissioner Clausen. Being the son of a political "boss" isn't everything.

It is rumored that Alexander Winton will enter the auto race in connection with the Paris exposition next year.

A Philadelphia newspaper has introduced the auto into service for quick delivery of papers.

AMBU BRINGS OUT IMPROVED BATTERY BOOK

The 1922 edition of The Automobile Storage Battery (Its Care and Repair), by O. A. Witte, is now ready for distribution. It is published by the American Bureau of Engineering, Inc., Chicago, Ill.

The early editions of this book were wonderful store-houses of information but this edition outshines the earlier ones. It is an up-to-the-minute reference book for any battery shop. To tell what it contains in a few words would be out of the question, but in glancing through it a few points seem to leave a particularly strong impression. For example, it tells the truth about "dope solutions." It gives information on radio batteries, also farm lighting batteries. It gives instructions for any job that might have to be done in the battery shop. It gives age codes on all well known batteries.

Finally and perhaps most important of all, it gives a chapter on business methods, information which is so needed, in order that the good work done from a mechanical standpoint shall show a profit for the owner of the shop.

Tightening Camshaft Chains

THE increase in the use of the silent chain for front end drives of engines has made it imperative that the maintenance man know as much as possible about the necessary operations which are bound to come up from time to time in adjusting the tension on these chains.

Most of the engines which now use silent chain drive have provisions for adjustment on the outside of the chain case. In the old days it was often necessary to remove the radiator and front end cover to get at the chain adjustment. Now the same thing can be accomplished by loosening a nut and screwing in or out on a member supporting an adjusting sprocket, the position of which governs the tension of the chain.

Frequently it happens that the chain can no longer be adjusted by ordinary means and it becomes necessary to remove a link. A reader recently asked for the best way to remove the offset link in the chain of a Hupmobile. The following applies:

In connecting the Morse rocker joint silent chain it is imperative that the rocker and seat pins be properly inserted. In all probability this car is equipped with a Morse rocker joint chain. The method of shortening this chain depends on the number of links in the chain, that is, whether it is an odd number or an even number of links, the numerical quantity not being the factor. Before attempting the adjustment of chain it is advisable to familiarize yourself with the recommended methods for connecting the chain links.

To Connect the Ends of Chain

First: Place ends of chain over wheels or sprockets so that point of arrow is pointed in the direction which the chain will revolve, Fig. 3 and 4.

Second: Bring ends of chain together and lap the link plates in regular order as shown at Fig. 4.

Third: Insert "seat pin" (with washer riveted on one end) from far side of chain. Be sure that the ribbed side of pin points in the direction of rotation of the chain.

Fourth: Insert "rocker pin" from near side of chain as shown at Fig. 4 with segmental or pointed side of pin against the flat side of "seat pin" and towards direction of rotation. The relative posi-

tions of the two pins will be correct if they are assembled as shown in Fig. 1.

Fifth: Place washer on end of seat pin and after backing up with a suitable bar or wedge, rivet over the end with a few sharp blows of the hammer.

To shorten a chain one link by removing the Hunting Link—on a chain having an odd number of links:

All chains having an odd number of links must include the thin leafed sec-

tion marked "HL" in Fig. 5. This assembly of thin leaves is called the "Hunting Link." To remove hunting link for shortening, move the chain until the hunting link is on top of a wheel; then with chisel in a vertical position strike with a hammer until the washers "A" and "B" are split sufficiently to make them fall off. With the end washers off the pins the two joints can be driven out and the leaf plates of the hunting link will fall away when the chain is lifted. The chain has been reduced in length one link by this operation and it is again ready for operation after connecting the ends as described in previous instructions.

To shorten chain one link by removing four links and inserting three, one of which is the hunting link on chains having an even number of links:

Arrange chain with the arrow side as the near side either flat, as shown in Fig. 7 on some solid foundation, or on top of one of the wheels.

Select a joint at the HEAD of an arrow, and with hammer and chisel cut washer "C" until it falls off. Then move to the right four links and cut washer "D" also at HEAD of an arrow in same manner. Be careful that each severed washer is at the HEAD of an arrow, as otherwise the leaf plates of three link section will not mesh in regular order with chain.

Drive pins from joints "C" and "D" and remove links marked 1, 2, 3 and 4 as shown in Fig. 7. Insert three link section, Fig. 8, which includes the hunting link, in place of the section previously removed and be sure that the arrow on new section points in same direction as arrow on old section of chain. Bring ends together and connect as instructed in first paragraphs.

On a few cars having a chain with even number of links, two hunting links are provided. In this case one of these hunting links may be removed for shortening as instructions covering "Shortening by removing one hunting link."

Adjusting for Tension

The total movement for a properly adjusted chain will vary with the length of the chain between sprockets. If the length between sprockets is from 5 in. to 7 in., the total free movement should be $\frac{3}{8}$ in. to $\frac{1}{2}$ in. If 8 in. to 11 in. the total free movement should be $\frac{1}{2}$ in. to $\frac{5}{8}$ in. The free movement is the distance up and down the chain that can be moved as shown in Fig. 6.



Fig. 3

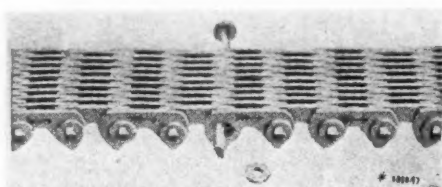


Fig. 4

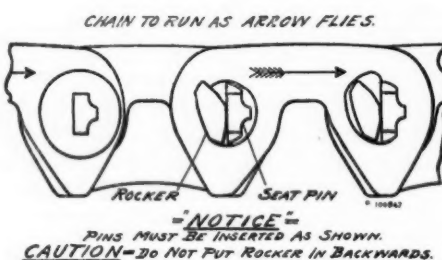


Fig. 1

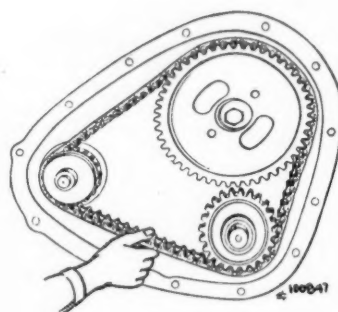


Fig. 6

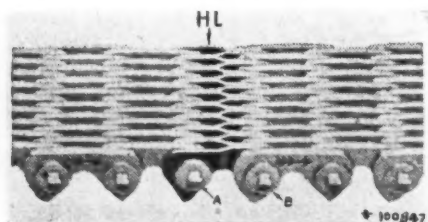


Fig. 5

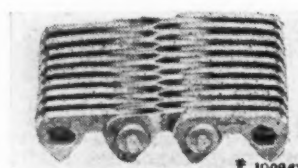


Fig. 8

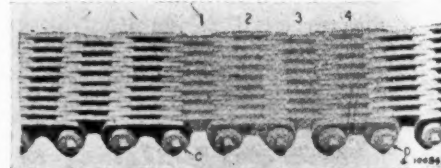


Fig. 7

Sell the Motorcycle for Its Utility Value

An Undeveloped But Valuable Sales Field Is Open to the Automotive Dealer Who Gets the New Angle on This Transportation Unit

THE sale of motorcycles by automobile dealers is attracting some little attention and some small-city dealers are beginning to look into this possibility of adding to their incomes without having to enlarge their facilities or greatly increase their investment.

It has been the history of the motorcycle that it has been sold more as a luxury or a recreational transportation unit than as a utility unit, but the fact remains that it is a very fine utility machine and it should be more generally regarded as such than it has been.

There is no question but that the motorcycle is the most economical and most speedy method of covering distance of any of the flexible transportation units. There are some disadvantages and often the objection is made that the traveler must "go light" or without baggage if he travels in this way. This is, of course, not the fact. A motorcycle traveler who has properly equipped his machine can easily carry a considerable amount of baggage and can, a few moments after his arrival at any point, appear in public attired to suit his fancy.

The Sidecar for Baggage

It is rather unusual that so many persons who aspire to a cheap and flexible transportation unit have never considered the motorcycle sidecar as a baggage carrier. With a side car built similar to the delivery side cars, the traveler can carry a considerable amount of baggage, certainly enough to make himself entirely presentable after he has doffed the dusty travel clothing.

Indeed, in many communities, the side car appears to have been entirely overlooked as a means of light merchandise delivery. In other communities where the motorcycle dealer has had an eye to the practical, the streets swarm with motorcycle delivery vehicles and certainly the merchants who use these vehicles meet the emergency more cheaply than the dealer who must send a heavier vehicle on this errand.

The motorcycle side car appears to hold great possibilities. Any one who has been observing, has seen these cars turned to numerous utility purposes but there are hundreds of communities that cannot boast of a single utility motorcycle. It would seem that the working men who are likely to be shifted from one part of the city to another frequent-

ly and who must carry with them substantial tool boxes, could make good use of the side car motorcycle.

Transportation for Workmen

Every one of these men will tell you how much he dislikes to carry this tool box around in the street car and bump people's shins. Every one of these men is a candidate for a proper kind of motorcycle and he will realize that he can quickly save the cost of it in transportation, besides the great saving of time. As a rule men of this sort are thrifty and a saving of time appeals greatly to them.

The automobile merchant probably will not care much to sell motorcycles as they have been sold in the past. He will not care particularly to cater to the sporting crowd who like the motorcycle because it is a speed machine, and he will not have to. The automobile merchant has never made his store the headquarters for the crowd that cared for the automobile merely because it lends itself to sporting tastes. The best automobile merchants have frowned on this buyer and they have, in many cases, assisted in bringing this man to a proper appreciation of the vehicle rather than encouraged him in tactics that they do not approve.

There is a place in the automotive scheme for the motorcycle as a utility vehicle and it should be put into that place. The automotive merchant can do it better than any other merchant.

Motorcycles for Hunting Trips

Much advertising has been done this fall for the motorcycle as a vehicle for hunters who like quick and flexible transportation. With the side car the hunter can get to his hunting grounds quickly, he can carry his outfit with him and these days there is little danger that he will get more game than he can bring back in his vehicle.

There is not a community in the country where there are not several enthusiastic hunters and many of these do not get to enjoy their sport as much as they would like because they cannot afford to keep two cars and they do not care to deprive the rest of the family of the car while they are in the woods. With the economical, swift and sure motorcycle at hand, these men can travel faster, more economically and be always ready to go without the drawback of taking the fam-

ily car. Then, too, many of the hunters and fishermen like to go places, in search of sport, where it is difficult to take an automobile but where a motorcycle can be taken readily.

These are just some of the points that can be considered in making the motorcycle a part of stock in trade of the transportation merchant. The motorcycle will not sell itself in great volume. It is misunderstood to a very large extent and will need to be introduced into a new society to come into its own, but this can be done profitably.

Service Not Different

Of course the seller of motorcycles will be expected to give service on this vehicle. This is not especially difficult but it requires a somewhat higher degree of mechanical accuracy than the other vehicles that are commonly serviced in automotive stations.

The automotive mechanic has failed chiefly because he has allowed himself to believe that the motorcycle is a different vehicle entirely. It is not. It has the same fundamentals as the automobile but is manufactured and assembled to closer tolerances and is generally a more delicate task. The automotive mechanics who have worked over stock models for additional speed as racing or sport vehicles will readily grasp the difference between automotive and motorcycle mechanics. The engine is an internal combustion power plant and the principals are the same as in the aircooled automotive engine. The trouble shooting has some peculiarities but in the main the work is much the same.

Architectural Service Pamphlet

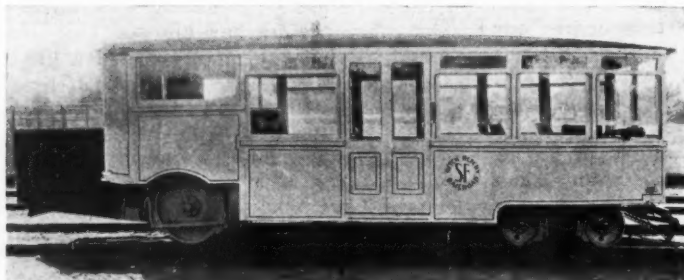
For several years MOTOR AGE has supplied an individual architectural advisory service to all of those who requested the assistance of this publication in building problems. This service has grown to such an extent that a special pamphlet, "Building Suggestions for Automotive Dealers," has been published by MOTOR AGE and is sent to automotive dealers on request.

If you have building problems before you we would suggest that you provide yourself with a copy of this pamphlet and see if it does not answer your questions. If, after reading this pamphlet, you still have questions, ask them.

MOTOR AGE'S PICTURE PAGES



Capt. J. M. Emery, Manager of the Marine Department of the Lackawanna Railroad, is explaining the new cable device on ferryboats. The cable device is intended to keep cars or trucks from running wild when drivers lose control. The chains or cables are added to the gates at either end of the ferries, and they prevent a slipping car or truck from plunging into the water.



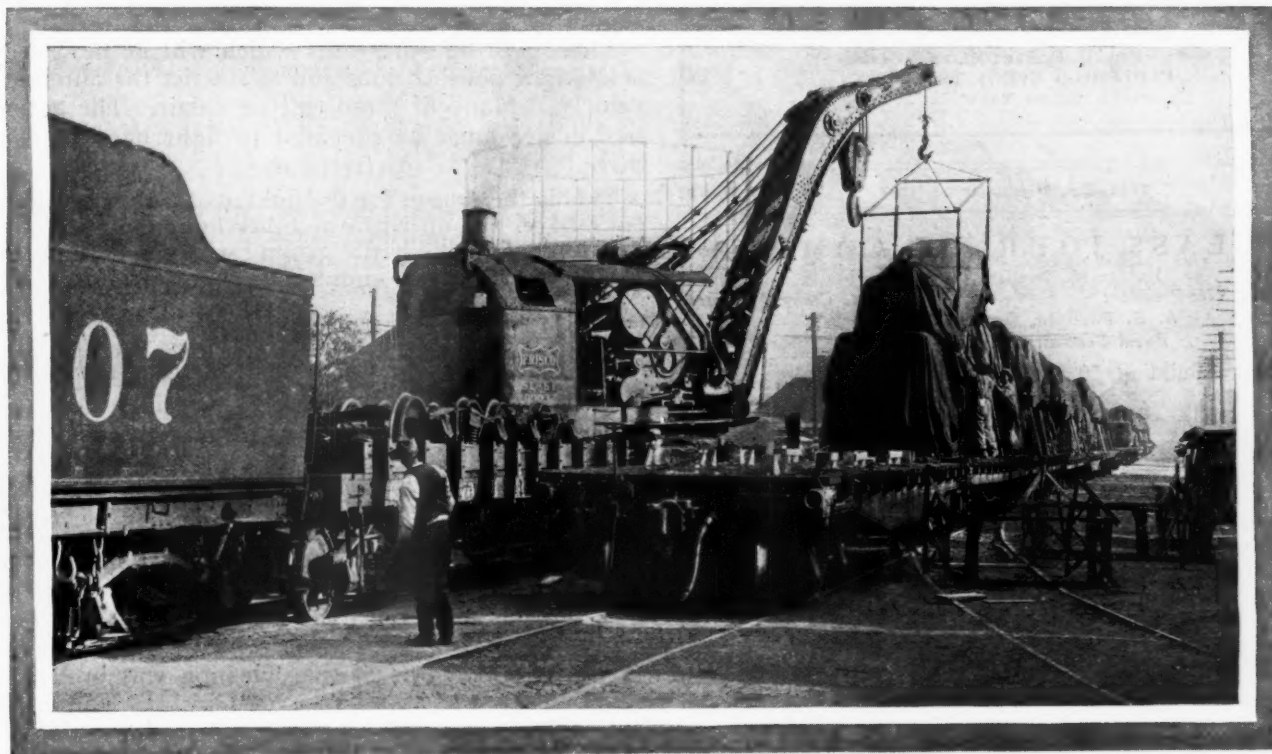
The gasoline railway car shown above was recently supplied to the famous Hetch-Hetchy Railway, at Groveland, Calif., by The A. Meister Sons Co., of Sacramento. In its trials it negotiated a 5 per cent grade, 12 miles long, with numerous 30 degree curves, at a speed of 27 miles per hour.

D. B. Scott and George E. Young, map experts of the National Motorists' Assn., are shown below in the official road car of the association, in which they are making a tour to prepare accurate and up-to-the-minute detail maps of the principal routes to Florida from all parts of the country.



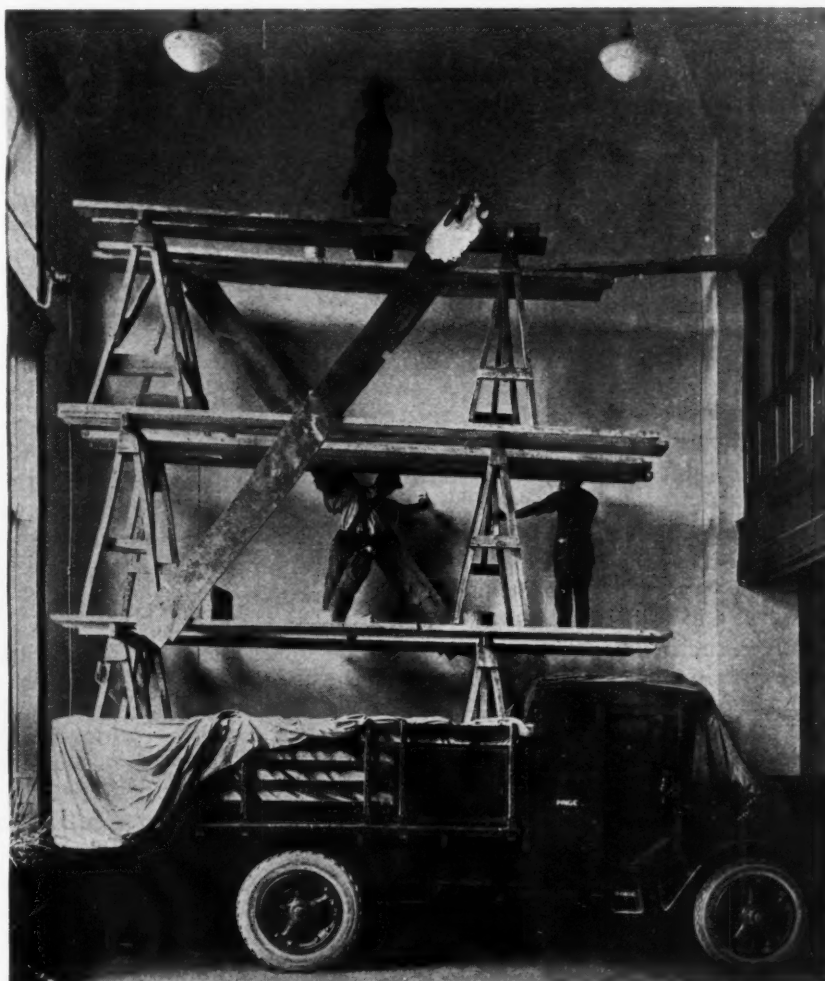
Charles M. Schwab and a group of Stutz distributors and employees at a recent conference at the Stutz factory. Front row: I. B. Meers, district manager; W. A. Pungs, Jr., Detroit; E. T. Klee, purchasing agent; F. D. Cerf, Chicago; Fred Wilson, sales manager; H. R. Fletcher, New York; Charles M. Schwab; President W. N. Thompson; William Glickert, factory superintendent; Charles W. Anderson, district manager. Back row: R. H. Schmittiel, Detroit; J. K. Graves, Nashville; George Kaeser, Hartford; H. R. Wilson, Bethlehem, Pa.; L. V. Bedell, assistant treasurer; George Hoever, Pittsburgh; Stanley Whitworth, assistant manager; H. S. Thomas, Cleveland; George Norwood, Baltimore; R. D. Baughman, Akron; Earl Devore, order department; Earl Stone, district manager; J. C. Pearson, traffic manager; Bohn E. Fawkes, Minneapolis; L. W. Frizzell, Mansfield, O.; Fred Johnson, assistant sales manager; L. D. Brown, service department; Wm. Blair, Buffalo.

OF AUTOMOTIVE INTEREST



A trainload of Buick automobiles, 48 cars, were recently unloaded at Birmingham, Ala., by means of a wrecking car. The whole job, which by the usual method would have occupied a number of men for several days, required only four hours. This was possible because the shortage of railroad cars made it necessary to use flat cars in place of box cars.

How the Automobile and Supply Limited, Toronto, Hupmobile, Jewett and Paige distributors utilized one of their service trucks as a mobile mounting for scaffolding in re-decorating their lofty salesroom. The interior decorators were thus enabled to work at three elevations above ground



"Remember way back when," in 1904, lamps were the most prominent, expensive and largest part of the car? Here is an example of a lamp of that day as advertised in *MOTOR AGE*. These lamps were not stock equipment then, but were sold direct to the consumer

MOTOR AGE

Reg. U. S. Pat. Off.
PUBLISHED EVERY THURSDAY
Copyright 1922 by The Class Journal Co.

Vol. XLII

Thursday, December 14, 1922

No. 24

THE CLASS JOURNAL COMPANY

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W. I. Ralph, Vice-President E. M. Corey, Treasurer
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Cable Address.....Motage, Chicago
Long Distance Telephone.....Randolph 6960

SUBSCRIPTION RATES

United States, Mexico and U. S. Possessions.....	\$3.00 per year
Canada.....	5.00 per year
All Other Countries in Postal Union.....	6.00 per year
Single Copies.....	35 cents

Subscriptions accepted only from the Automotive Trade

Owned by United Publishers Corporation, Address 239 West 39th St., New York; H. M. Swetland, President; Charles G. Phillips, Vice-President; A. C. Pearson, Treasurer; Fritz J. Frank, Secretary.
Entered as second-class matter Sept. 19, 1899, at the post-office at Chicago, Ill., under the Act of March 3, 1879.
Member of Associated Business Papers, Inc.
Member of the Audit Bureau of Circulations.

Are You a Fighter

THE Illinois Automotive Trade Association used the above line as the heading for a bulletin recently sent to the members, asking them to renew their membership for the coming year so that the association might go before the legislative committees when bills were under consideration, and speak with authority for a large number of dealers within the state.

This challenge would appear to be entirely well placed at this time. There never has been a legislative season, not even excepting war times, when the automotive dealer industry was more menaced by legislation than at present, and those dealers who wish to survive must not only fight in their especial trade district but they must fight in the legislative halls of the state and nation. Every cent of additional tax laid on the automotive industry, or the automotive vehicles that are in the hands of the owners, means a restricted use of these vehicles, and that means less business in supplies, maintenance and allied lines.

There is only one way for the dealer to meet the grasping tax collector, and that is to organize and stand by his organization. He must take an active hand in promoting his own interests and those of his customers, and he must be equally active in defending them from

the revenue-only legislator. There are going to be many bills proposed to the legislatures this season. Some of them will be excellent bills, proposed to better traffic and highway conditions. The automotive dealers should be prepared to fight hard for these.

There will be other bills which will be designed to create new political jobs and to restrict the automotive vehicles. Many of these will be unfair. The automotive dealer must be prepared to fight hard to defeat these.

This is the season for the fighter. Are you a fighter? If you are, line up with the other fighters and you will be able to view the battle ground with the thought that, whatever happens, you did your share.



The gas pump is the traffic point, the place to sell equipment.—SHERMAN.



Tractors and State Fairs

THE tractor and power farming machinery manufacturers of the country are apparently turning their attention to what would appear to be the most obvious means of publicity for their output—The State Fair.

The present status of this question was brought to attention by the appearance of Guy H. Hall of the National Institute of Progressive Farming before the International Association of Fairs and Expositions at Toronto, recently. Hall, in his usual lucid manner, told of the idea of a "Power Farming Day" at these state fairs and he quoted a number of manufacturers who had written to him in regard to their attitude toward such exhibitions. Most of these manufacturers favored such a day and exhibition but one manufacturer objected. He said that the fair had degenerated into a form of amusement and that the attention of the people was centered upon automobile racing and midway entertainments.

This illustrates a point that can be brought into question. Too often the promoters of an educational proposition rely upon what they think should be the interest of the public in their problem and they do not put forth the proper effort to interest the people. The amusement crowd knows very well that as soon as they neglect the preparation, the interest falls off and there is nothing doing. Consequently they keep on edge.

How can the tractor manufacturer know whether or not there will be an interest in his proposition until he has tried this out in some attractive form. He and his fellows have spent thousands of dollars seeking to get prospective tractor users to come to exclusive tractor shows and also so-called national demonstrations. Some have professed to be satisfied with the results of these shows.

The State fair offers a much better proposition. Thousands of people, farmers, will be there and to interest them in the power farming exhibition will be only incidental. There should be an opportunity to interest thousands who would not go to an exclusive tractor demonstration, and all who would go to a tractor demonstration surely would attend a power farming day at a state fair.

Speaking from the standpoint of the dealer, it would seem that a power farming day at the state fair would be an admirable promotion day. Eventually this demonstration will set a pace for a proportional exhibit at

the county fairs and then things will be as they should be. The automotive industry has profited much from the state and county fair exhibitions.



Not one car is going 100% car satisfaction to the owner. Help to make that satisfaction more perfect.—SHERMAN.



Associations

THERE are two types of business associations—those that take in all establishments in the line of business represented, and those that are more or less particular about the standing of their membership.

The rule has been that an association should take in all of the business houses in its line and seek to elevate them to a proper standard by association with good business men presenting to them at meetings a high business ideal.

Recently there has been something of a change in this idea. The National Automobile Dealers' Association set a very high goal for its work when it decided on a selected list of members. This was made necessary in part by the service this association is to render to its members, but the first thought in this movement was that there should be some place an honor roll for the best type of automotive dealer and that the N. A. D. A. should supply this roll.

Another idea has come to the front in the organization of maintenance or service associations. A number of these are being organized as bureaus of the dealer associations and only maintenance managers of members of the dealer associations are invited. The manager of one of these bureaus explains that he wants to be very sure that he has a corps of worth while members before he undertakes the evangelism of the entire field. After a maintenance standard has been established, the independent maintenance dealers will be invited to attend.

We believe that in the end this program will obtain everywhere, because the dealer maintenance managers will soon realize that their job of giving dignity to their branch of the automotive work is only half done without the independent maintenance dealer being brought up to their standard.

Another type of automotive dealer association is that type which has as its objective the profits from the annual show and which limits its membership to one representative of a car. This type of association is not well foundationed and is passing.



You've got to take the knocks and leaks out of your profit-making machine to make it run right.—SHERMAN.



Cold Weather Suggestion

IF you have owners in your territory who have stored their cars for the winter, why not find out who they are and start the sales force to work on them for next year? Perhaps you will find them a little hard to approach but any barrier is easily broken down by painting a few pictures of the pleasures the owner had last year and the new ones he will have in 1923 if he buys one of your cars.

If it is a case of finances, why not make him an

offer on the old car and take it off his hands? Tell him that you will apply the trade-in price on the first payment of a new model to be delivered whenever he says he wants it. In the meantime, he can be laying away whatever is needed to make up the down payment and arranging his plans to meet the monthly payments that are to follow.

In the spring when he gets his new car, he can pay the rest of what he owes you on the down payment and he will be prepared with a plan whereby he can meet his notes each month without "pinching" himself. Buying old cars in this way, you will have something for the shop to do in slack times in the way of reconditioning them and getting ready to move in the spring.



Sell your work by the job.—SHERMAN.



A Tire Incident

A SUBSCRIBER of MOTOR AGE writes regarding his situation as to tire sales about as follows:

"There is a tire factory in our community and it is making a special drive to have its tires used by the automotive vehicles hereabouts. This effort has become so marked that this company, through salesrooms conducted by the factory, is giving a free service that is not possible for a man who must pay the wholesale price for his tires and resell them. Also this company is contriving in many ways to cut the prices of their tires to local owners. What can we do in this situation?"

There is only one possible remedy for this situation and this is the education of the tire manufacturer. He must be taught that bad merchandising methods are not profitable in the end. He is undoubtedly taking advantage of the disorganized state of the retail tire industry. In an Illinois city of considerable size there is a good working Tire Dealers' Association. The members of this association discuss at each meeting the practices of factories and as a result of this comparison of notes three of the larger factories of the country are not represented in that city. The chief objection there was that the factory branch managers sold tires at wholesale to some of the best customers in the community.

This information has spread to other cities and the manufacturers have lost dealers in nearby communities. Probably the sales made at wholesale in this community were as expensive favors as these companies ever granted to any one.

The above incident merely illustrates what organization can do. If the complaining tire dealer had some means of spreading broadcast the unethical practices of the manufacturer in his community, the tire maker would soon see the error of his ways and reform his merchandising methods. For the present, there is only one remedy that this dealer can undertake. He can continue to do business on sound principals and tell his customers the truth about his merchandise and about the unethical methods of his factory competitor. If he can stand the strain of a few lean months, control his temper and continue his plan of ethical and fair priced merchandising he will eventually win. This is based on the reasoning that a factory that is grabbing for business by such methods needs pennies too badly to survive.

Forecast of 1923 Motor Car Trend

Completely Equipped Vehicle to Predominate at the Shows

M. A. M. A. Finds Pronounced Leaning Toward Lower, Lighter Cars of Distinctive Appearance

NEW YORK, Dec. 9—Forecasting the trend in motor vehicle design that will be brought out at the national shows next month, based on the opinions of leading parts manufacturers who are contributing to its annual symposium, the Motor and Accessory Manufacturers Association declares that the dominant feature of 1923 will be the complete vehicle, not only of passenger cars but also motor trucks.

There will be many other features stressed at the show, such as the continued swing toward greater production of light sixes, the predominance of enclosed cars, the emphasis on sport models, further emphasis on light weight construction, a tendency to lower the cars to secure a racy appearance, an effort in the direction of simplification of design and greater engine efficiency, but outranking all these will be the trend toward making motor cars genuinely complete and ready for use in every detail in order to enhance the comfort, ease and economy of operation.

More and more appointments and devices which have in the past been regarded as extras or accessories, are being adopted as standard equipment by vehicle manufacturers, declares the M. A. M. A. This does not mean the widespread standard installation of all accessories, but it does indicate that items that are indubitably useful and economical are being added in increasing numbers to the original equipment list. This tendency makes possible a reduction in manufacturing cost on such units and accessories, cuts down distributing expenses, increases operating efficiency and in the long run aids the industry and public.

Interpreting this development in the automotive industry, M. L. Heminway, General Manager of the Motor and Accessory Manufacturers Association, says:

"Instead of bringing about indiscriminate use of accessories, this trend will put the car equipment manufacturers to the test; only those accessories that are really useful and sound will meet the rigid requirements imposed by the engineers and executives of the vehicle builders, who in turn must be open minded and constantly responsive to the dictates and needs of a public desiring more complete, more efficient, and more economical vehicles."

Special progress will be evidenced in body design and construction. This will apply not only to the more obvious ele-

ments, but to the small details such as door handles, windows, and other appointments making for easier riding and better ventilation.

A sharp upward swing in the standard equipment listing of shock absorbers and bumpers, is typical of the current practice of the car builders.

"After the automobile shows," says Alfred Reeves, general manager of the National Automobile Chamber of Commerce, in a letter to General Manager Heminway, "there will undoubtedly be a big campaign on closed bodies of various types, low priced and high priced. It is undoubtedly the car of the future. I doubt whether there will be very many mechanical changes in chassis except the possible tendency of a few more of the four-cylinder car makers getting into the six-cylinder field."

Detailed analysis of the changes in construction and design is offered by H. L. Horning, general manager of the Waukesha Motor Co., Waukesha, Wis., and a director of the Motor and Accessory Manufacturers Association:

"New truck designs will show greater engine efficiencies and more miles per gallon of both gasoline and lubricating oil, higher speeds and lower upkeep charges. On both truck and pleasure cars there will be shown decidedly better designs which have for their object more efficient vaporization of present fuels and less dilution troubles and smoother running of engines and more consistent performance in all details. All cars will be clean in lines and there will be a tendency to lower the cars by decreasing the height of the frame from the ground and also the tops, thus giving the racy appearance for cars of wheel bases of 110 in. or less. The lower tops will be carried down to such an extent as to cause a very small clearance between the driver's head and the top. Better finish will be general and the general lines will be smoothed out and cars will be improved in usefulness by supplying more convenient means for carrying luggage of all kinds. There will be a number of new body models, especially useful for traveling men and general business use."

G. Brewer Griffin, manager of the Automotive Equipment Department of Westinghouse Electric & Manufacturing Co., looks forward to "more efficient engines, better gears, synchronizing transmission gear shifting devices, and probably 'closed bodies' will appear of the 'knock down, removable upholstery' type."

REFUSES TO HANDLE USED CARS

BALTIMORE, Dec. 11—The Chevrolet Motor Co. retail store, 116 Richmond street, has announced that hereafter it will handle no more used cars and every one will be disposed of at once.

Bureau of Public Roads Budget for 1924 Is Large

Big Sums Recommended to Congress for Improvement in Nation's Highways

WASHINGTON, Dec. 9—One of the largest recommendations in the new budget for 1924 filed with congress is that of the Bureau of Public Roads. A total of \$105,966,000 is recommended by the Budget Bureau, of which \$100,000,000 is for cooperative construction of rural post roads—representing an increase of \$3,000,000 over the estimated expenditure for the fiscal year of 1923 and an increase of \$5,000,000 over the sum actually expended in fiscal year of 1922.

For the construction of forest highways, \$4,500,000 is recommended and for the cooperative construction of roads and trails through the national forest \$1,136,000 is asked. The general expense of the bureau at Washington and for field men will require \$330,000 for the fiscal year of 1924, and represents a decrease in administrative expense of \$110,000.

The actual expenditures during the fiscal year 1922 for public Federal-state highways was \$93,322,892.53. The expense for the fiscal year ending June, 1923, it is estimated, will be \$102,916,857, and the amount asked for the year of 1924 will be an increase of \$3,050,000.

SAYS PRICES MAY INCREASE

CHICAGO, Dec. 9—Charles W. Nash, president of Nash Motors Co., addressed a meeting of about 300 Nash dealers and salesmen in Chicago Thursday night. He declared that under no circumstances would he guarantee that there would not be an increase in the price of his company's product before next spring, but that he was confident there would be no reduction. He mentioned the increasing cost of steel and other raw materials entering into automobile manufacture. E. H. McCarty, sales manager of the company, also spoke, and both he and Nash predicted that there would be an enormous demand for automobiles next spring and summer.

H. A. BIGGS TOURS SOUTH

MEMPHIS, Tenn., Dec. 9—Harry A. Biggs, vice-president of the Studebaker Corporation of America, was through the south several days ago taking a look at Studebaker places in Memphis, Tupelo, Miss., and New Orleans. A banquet was given him at the Grunewald Hotel, New Orleans, and he took part in the dedication of the Capitol City Auto Co.'s new building, opened with ceremony in New Orleans.

Greater Production for Next Year

"Trucks Must Feed, Not Compete With Railways"—Harding

President Wants Transportation Systems Coordinated to Save Rail Lines from Loss

WASHINGTON, Dec. 11—Recognition of the important part the motor vehicle plays in the life of the nation was voiced by President Harding in his address to Congress last week, when he said:

"Manifestly, we have need to begin on plans to coordinate all transportation facilities. We should more effectively connect up our rail lines with our carriers by sea. We ought to reap some benefit from the hundreds of millions expended on inland waterways, proving our capacity to utilize as well as expend. We ought to turn the motor truck into a railway feeder and distributor in instead of a destroying competitor.

"It would be folly to ignore that we live in a motor age. The motor car reflects our standard of living and gages the speed of our present-day life. It long ago ran down simple living, and never halted to inquire about the prostrate figure which fell as its victim.

"With full recognition of motor car transportation, we must turn it to the most practical use. It cannot supersede the railway lines, no matter how generously we afford it highways out of the public treasury. If freight traffic by motor were charged with its proper and proportionate share of highway construction, we should find much of it wasteful and more costly than like service by rail. Yet we have paralleled the railways, a most natural line of construction, and thereby taken away from the agency of expected service much of its profitable traffic, for which the taxpayers have been providing the highways, whose cost of maintenance is not yet realized.

"The Federal Government has a right to inquire into the wisdom of this policy, because the National Treasury is contributing largely to this highway construction. Costly highways ought to be made to serve as feeders rather than competitors of the railroads, and the motor truck should become a coordinate factor in our great distributing system."

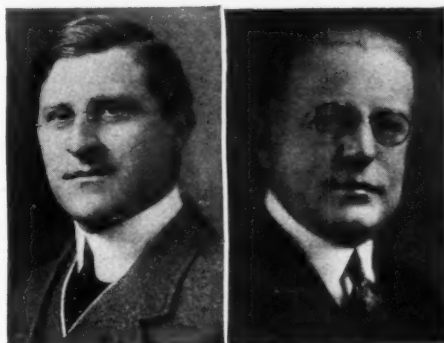
Highway Officials Want Two-Cent Gasoline Tax

KANSAS CITY, Mo., Dec. 11—The National Association of State Highway Officials, meeting in Kansas City, Dec. 5-9, passed a resolution dissenting from the proposal that motor vehicle revenues be limited to maintenance requirements. It advocates instead, that motor vehicle taxes be used to pay a part of construction cost.

The resolution suggests that one-third of the total cost of Federal, state and county road programs be met from motor vehicle taxes, and advocates a gasoline tax of not less than two cents a gallon.

The automotive industry was represented at the meeting by A. J. Brosseau, president, Mack Motor Co.; R. D. Chapin, president, Hudson Motor Car Co. and Pyke Johnson, secretary of the N. A. C. C. Highways Committee.

Leaders of Truck Association



M. L. Pulcher

Hal T. Boulden

At a recent meeting in Detroit, M. L. Pulcher, president of the Federal Motor Truck Co., was re-elected president of the National Association of Motor Truck Industries and Hal T. Boulden, vice-president of the Selden Truck Corp., was elected first vice-president. At the same meeting the name of the association was shortened to Motor Truck Industries, Inc.

NEW AUBURN DETAILS

AUBURN, Ind., Dec. 9—More details of the new Auburn Six have been announced by the Auburn Automobile Co. The Continental 6-Y engine will be used and the clutch will be Borg & Beck. The gear-set will be a Warner three-speed type. Remy starting, lighting and ignition will be regular equipment. The side members of the frame will be 6 in. channels of heavy gage metal. There will be four cross members heavily gusseted with tubular members at each end of the frame.

ANN ARBOR DEALERS ORGANIZE

DETROIT, Dec. 9—Dealers of Ann Arbor, Mich., have formed the Ann Arbor Automobile Association with Benjamin Woodbury, president; Sewell Platt, vice-president; Robert Alber, secretary, and Ray Vogle, treasurer. The Ann Arbor dealers will continue as members of the Washtenaw County Automobile Dealers' Association and will also be affiliated with the Michigan Automotive Trade Association. The formation of the Ann Arbor group makes twenty-five dealer associations in the state, most of whom are affiliated with the State association.

Factories Preparing For Increased Demand for Cars

Market Broadens in South, But December Output Will Be Short of Average

NEW YORK, Dec. 11—The automotive industry, with a record back of it this year unsurpassed in its production history, is beginning to prepare for an even greater output in 1923. Factory operations are taking on a more conservative tone as the month advances toward the annual inventory period, during the holiday season, with the result that December will fall somewhat short of the average maintained during the previous months of the year.

This is an expected situation and does not indicate that there has been any pronounced lull in the demand for cars. The surprising feature of the last few months is that the volume of sales in a naturally dull season enabled manufacturers to operate on schedules that brought the total output for 11 months to exceed that for all of 1920.

Production is taking care of current demands as well as the many back orders that have been held up because of the lack of closed bodies. The shortage of bodies is still a great drawback to prompt deliveries.

With December on a satisfactory basis, even in comparison with the best months of the year, brisk activity will be resumed after the first of the year when New York ushers in the show season and such plants as now are operating on curtailed programs return to quantity production. The end of the inventory period will find factories in a condition to enter the production year with greater facilities to take care of the anticipated demand.

The New York show will present for the first time a number of new models, as indicated by the showing of the higher priced lines at the New York salon last week. Keen interest already evidenced doubtless will set a new record from the point of show attendance.

New fields are developing for the sale of automobiles, with the South in particular coming back into the market with the best outlook presented in many months. Conditions in practically all of the southern states have shown remarkable improvement as prices of farm products have steadily advanced.

FIRESTONE DENIES RUMORS

AKRON, O., Dec. 11—Continued reports that he is heavily interested in the establishment of a proposed new \$10,000,000 automobile plant at Ridgeway, W. Va., are steadfastly denied by Harvey S. Firestone, president of the Firestone Tire & Rubber Co.

2000 Attend A. E. A.'s Largest Automotive Merchandising Convention at Chicago

"Ask 'Em to Buy" and "Shop Profits" Films Exhibited at Meeting Arranged by Eight Jobbers—Sherman Delivers Address

CHICAGO, Dec. 9—The record of the Automotive Equipment Association merchandising meetings took a step upward Wednesday night when 2000 men and women went to Medinah Temple to hear this gospel of better merchandising of automotive accessories and maintenance, and the better conduct of the store and shop. The largest previous meeting was that held in Brooklyn at which 1700 were in attendance.

Ray W. Sherman, merchandising director of the A. E. A., was the speaker of the evening and members of the Merchandising Committee were in the audience. Sherman's story was well received and the two films "Ask 'Em to Buy" and "Shop Profits" were shown. The latter film was the Ambu Institute version, with 1700 feet of pictures devoted to electrical equipment, operations made by the Institute and the operation of the residence school.

The audience was a cosmopolitan one, ranging from the members of the Merchandising Committee, jobbers, car and accessory dealers, to salesmen and shop employees. The crowd was handled by 140 jobbers' salesmen who served as ushers. Clyde Jennings, editor of Motor Age, presided.

These firms promoted the meeting: The Automotive Supply Co., Chicago Auto Equipment Co., Chicago Automobile Supply House, Beckley-Ralston Co., Electric Appliance Co., Motor Car Supply Co., E. D. Kimball & Co., and the American Bureau of Engineering, Inc.

The Chicago Automobile Trade Association co-operated actively in creating interest in the meeting and many members of the association were represented by large groups of their employees and officials. Some of them made special arrangements to permit their employees to attend the meeting.

Mystery Surrounds Proposed \$10,000,000 Automobile Plant

WINCHESTER, Va., Dec. 11—Mystery continues to envelop the principals in the reported deal to construct a \$10,000,000 automobile plant at Ridgeway, nine miles from here. Ernest L. Luttrell, of Martinsburg, the attorney who is said to represent the financial interests, still refuses to mention names, but a contract has been let for laying out the town site, consisting of 2500 acres, which will be the home of the workmen in the big plant. About the only development that has been given to the public is that the name of the town is to be changed from Ridgeway to Detroit, W. Va. Pihl & Miller of Pittsburgh, the engineers who are said to have the contract for building the plant, are reported to be on the ground and ready to start operations.

It is denied that the whole affair is a scheme to sell land and Luttrell declares that those interested in the deal have nothing to offer for sale in the way of stock, bonds or lots.

J. & B. BUYS BERKSHIRE CO.

PITTSFIELD, Mass., Dec. 9—The J. & B. Mfg. Co. has purchased the Berkshire Magneto Co. and is forming a larger concern to be called the Berkshire Products Corp., to produce on a bigger scale the principal products identified with the two companies. This change will be effective Dec. 10. The Berkshire Magneto plant is to be closed and the equipment moved to the J. & B. plant. It is understood that the ignition coils and timers for cars, trucks and tractors, leading J. & B. lines, and magnetos and windshield wip-

ers, leaders for the Berkshire Magneto Co., will continue to be largely manufactured, together with other apparatus of an automotive nature. By the merger, Frederick G. Crane and his son, Frederick G. Crane, Jr., who have been the principal owners of the Berkshire Magneto, acquire a substantial interest in the consolidated property, whose capitalization is to be increased. Edward T. Shaw of the Berkshire Magneto will be retained as research engineer. The officers will be: President, treasurer and general manager, George H. Southard; vice-president and director of sales, Harrie R. Williams; secretary and assistant general manager, Raymond D. Tufts.

The merger reunites two concerns that sprang from the old Pittsfield Spark Coil Co.

OLDS WINDOW CONTEST

LANSING, Mich., Dec. 11—A holiday window display contest for all dealers and distributors of the Olds Motor Works has been arranged, according to Guy H. Peasley, general sales manager. "Last year," Peasley said, "several Oldsmobile distributors attempted unique Christmas displays and the results were so good in their localities that it was decided this year to make the window dressing a national proposition."

GOODRICH ANNOUNCES INCREASE

AKRON, Dec. 9—The B. F. Goodrich Rubber Co. announces a 15 per cent increase in the price of its Silvertown tubes; 10 per cent, small size gray tubes and 5 per cent in the price of its large size gray tubes. Casing prices remain unchanged.

Dealers Find Dull Season Is Enlivened by the Enclosed Car

Cleveland Men Expect Big Winter Business in Sales of Enclosed Cars

CLEVELAND, Dec. 8—For years Cleveland automobile dealers and distributors have been casting about for some method to eliminate the annual dull winter period and now the enclosed car models have stepped forward to solve this problem for the winter.

The November that just ended was marked by a volume of sales that about equaled that in last October, which was the best October in the history of the industry here. The closed car sales kept the record up, according to several dealers who were visited.

Men like Robert Schmunk, of the Hudson-Stuyvesant agency, W. Pitt Barnes, of the Dodge agency, G. C. Peckham, of the Ohio-Buick, the Chevrolet and Ford dealers, are confident that business will be better in December and in the succeeding winter months than it has averaged in the past corresponding months.

There likely will be a let-up around the holidays and in January, but no such slackening of business as has been experienced in other years before the closed model came to the front. The business has become such that in several local factories production has been practically limited for some time to the closed cars.

This situation has brought about an entirely novel condition in the used car business here. Dealers have found it profitable to go to the records, find the names of owners of closed models and to persuade them to sell or trade them in. There are few dealers in the city but that have on hand at all times unfilled orders for used closed cars.

The trade-ins that come in voluntarily are open models for closed ones. This has brought about an accumulation of the open cars in the store rooms of a number of dealers. The result is that for the present, at least, a number of dealers have been forced to lower prices for open used cars.

PREST-O-LITE COMPLAINT DROPPED

WASHINGTON, Dec. 9—Action against the Prest-O-Lite Co. of New York City, manufacturers and sellers of acetylene gas and containers, has been dropped by the Federal Trade Commission. The complaint charged unfair methods of competition and a tendency to create a monopoly on the sale of acetylene in that the company sells its metal cylinders containing acetylene gas and passes the title to the purchaser. It was also claimed that the Prest-O-Lite Co. maintained for its products a fixed resale price and eliminated all competition as to the price between dealers in its products, by refusing to supply dealers who resell its products at less than the price indicated.

A. A. A. 1922 Race Championship Standing

Distance	Los Angeles 3-8-22	Heats	Los Angeles 4-3-22	San Francisco 4-16-22	Fresno 4-27-22	Heats	Tacoma 7-4-22	Indianapolis 5-30-22	Uniontown 6-17-22	Cotati 5-7-22	Heats	Cotati 8-6-22	Kansas City 9-17-22	Fresno 9-30-22	Los Angeles 12-3-22	Total
Murphy	250	260	100	160	300	230	1000	300	225	250	500	60	300	150	250	3420
Milton	500	180								260	160	600	160	50	1910	
Hartz	140	35	300	90	115	520				35	3	320	90	140	1788	
Elliott	80	20		160	115						300	170	30		875	
Hill											44	35	300	80	459	
Hearne	50							270			43		20	10	393	
Wonderlich			20	20	3	41	90	80	16	55	50				375	
Sarles			90		50					140					280	
Cooper														260	260	
Mulford								160				95			255	
Klein			50	50	27			25	27		15	35	229			
De Palma					15	140								5	160	
Thomas	35		30	10	7	2		15						25	124	
Halbe						79	30								109	
Fetterman						33	50					25			108	
Wilcox								50							50	
De Paolo					15	13								15	43	
Alley						35									35	
Miller	25														25	
Vail						21									21	
Koetzla						19									19	
Shafer						17									17	
Morton						15									15	
Melcher										5					5	

Lee Resigns Government Post For Yellow Mfg. Co. Position

CHICAGO, Dec. 11—Gordon Lee, Chief of the Automotive Division of the Bureau of Foreign and Domestic Commerce, has resigned his government post to accept a responsible position with the Yellow Cab Manufacturing Co. of this city. His resignation takes effect Dec. 15.

Lee has been head of the Automotive Division since its inception under the Hoover regime two years ago. Installed simultaneously with some ten or twelve other commodity divisions, it has grown constantly in efficiency and scope under Lee's administration. It is now one of the most active and important of the commodity divisions.

Lee is making a return to active work in the automotive industry through his new connection. Before becoming chief of the Automotive Division, he traveled extensively in foreign countries as a representative of Gaston, Williams & Wigmore engaged in liquidating branch offices. His active merchandising work in the domestic field includes several years with Northways Motors, in the State of New York, where he gained considerable reputation as a missionary for the Fordson tractor.

A successor to Lee as Chief of the Automotive Division has not yet been selected.

NEW YORK A. S. A. MEETS

NEW YORK, Dec. 11—One of the best attended meetings ever held by the Automotive Service Association of New York

was held last week at the Automobile Club of America, over 200 service men being in attendance. Charles A. Neville of the Hinckley Motors Co. gave an interesting talk on carburetion and the new film produced by the Department of Commerce and the Cadillac Motor Car Co. was shown. Nominations of officers for the year 1923 were announced, these being Edward J. Rabidoux for president, J. W. Lord, W. A. Evans, Charles Michaels and T. E. Sweigert for vice-presidents, L. T. Hanford for treasurer, Al Bergmann for secretary and Dale P. Cartwright, Henry M. Holt, Harry L. Ferris, H. P. Cruse, J. Howard Pile and Ralph C. Rognon for directors.

A. S. A. HOLDS BIG MEET

SPRINGFIELD, Mass., Dec. 9—The Automotive Service Association of Springfield held the largest meeting in its history at the Technical High School Auditorium last night, well over 100 attending. The features of the evening were the presentation of a number of reels of film, including the Paige-Detroit dealer film and the Shop Profits film of the A. E. A. J. Howard Pile, Technical Editor of Motor World, told the assembled service men and dealers of the progress made by service from the viewpoint of the factory, dealer and owner.

TO DISCUSS CLOSED BODIES

DETROIT, Dec. 9—The Detroit section of the Society of Automotive Engineers, for its meeting Dec. 21, has selected as the subject for discussion, "The Future in Closed Bodies."

Jimmy Murphy Declared Race Champion by A. A. A. Board

Winner of Indianapolis Event Sweeps Through Year With Six Big Wins

NEW YORK, Dec. 9—Jimmy Murphy has been officially declared the champion driver of the year by the Contest Board of the American Automobile Assn., following the running of the last of the 1922 championship events at Los Angeles last Sunday. Murphy won the final race, but he really did not need that victory to clinch the title, for he was so far ahead no one could have caught him.

Murphy captured the championship with a total of 3420 points, gathered in the 12 title races of the season, this total being made up of six firsts, three seconds and two thirds. His chief win was at Indianapolis, which is almost a championship in itself, and he also won at Fresno, Cotati, Uniontown, Tacoma and Kansas City. He is the fourth holder of the title, which first was awarded to Dario Resta, then to Gaston Chevrolet and last year to Tommy Milton. Murphy has been in the limelight since last year, when, driving a Duesenberg, he was sent to France by Albert Champion, winning the French Grand Prix, the first foreign victory ever achieved by an American in an American-built car. This year Murphy drove a Murphy Special until Sunday, when he piloted a Durant Special.

Twenty-four drivers in all were awarded points this season, according to the official table issued by Chairman Croselmire of the Contest Board of the A. A. A. Murphy led the field ever since Indianapolis, with Tommy Milton runner up. Milton won three races this year, but failure to get placed at Indianapolis set him back so his pursuit of Murphy was futile. Hartz, third man, is one of the surprises of the year. The final standing is shown in the accompanying table.

NASH STOCK DIVIDEND

KENOSHA, Wis., Dec. 11—Plans for greatly enlarged financing of the Nash Motors Co. by a stock dividend which would give four shares of new common stock and three shares of new 7 per cent preferred to stockholders for each share of common now held, have been announced by Charles W. Nash, president of the company. The plans are to be submitted to the stockholders for approval at a meeting at Baltimore next Saturday.

The stock now outstanding is 54,600 shares of common and \$3,500,000 of preferred. The outstanding preferred stock is to be retired on Feb. 1, 1923, at \$110 a share plus accrued quarterly dividends, and the plans provided for a new issue of \$22,500,000 preferred stock. The common stock would be increased to 300,000 shares of no par value, providing for the distribution of 218,400 shares as a stock dividend. The preferred also would be issued as a stock dividend.

Ohio Association Favors Tax Repeal

State Dealers Urge Removal of Excise Levy on Vehicles

Legislative Program Also Calls for Uniform Traffic Laws and Protection Against Theft

TOLEDO, Dec. 9—That every division of the automotive industry has its own peculiar problems, that they interlock with the interests of others, and that the entire industry should work together to create a favorable view of the automobile business, were the outstanding points made at the sixth annual convention of the Ohio Automotive Trade Assn. which closed its three-day meeting here Friday night.

The entire plan of the convention, which was in the form of general discussion of automotive problems, sought to bring out the big fact that one part of the automotive business doesn't fight another and that better understanding of related problems will bring better business to all.

The subjects covered in the discussions were truck service and sales, operating the garage, batteries and electric stations, tire merchandising, passenger car service and sales, shop records and accounting, and handling of used cars.

"The automotive industry today has just as bright a future as it ever had," declared E. E. Peake, Kansas City, "and the fundamental reason why the much talked about 'saturation point' will not be reached for some time to come is that the automobile is ever increasing its field of usefulness.

"Cooperation" Is Keyword

"The manufacturer should co-operate to protect the dealer, salesmen should co-operate to cut down accident toll, and accessory men should co-operate with car salesmen to help their own business."

Harvey Wilson, New York, told of manufacture of tires and problems of merchandising, and urged all automotive men to "give the other man the benefit of the doubt."

Speaking on "The Dealer and 1923" George M. Graham, vice-president of the Chandler Motor Car Co., Cleveland, declared that after covering 41 states and visiting hundreds of automotive dealers he found them in a more prosperous condition than many other merchants and individuals in other lines of trade.

"Business in 1922 went forward in a big way despite price-cutting and many other ordinary discouragements," he said. "The time will not come for ten years at least when the market will have enough cars produced to satisfy it. During the last year \$3,500,000,000 of automotive products were produced and

workmen were paid more than \$350,000,000.

"That means that we are in a stable business.

"The automobile today is a form of real estate insurance. It has made suburban and farm property worth more than it was in the pre-automobile days. As the suburban property increases in value so does the market for automobiles grow and our business becomes more like that of the other merchants of the community."

The convention, attended by more than 350 delegates from all parts of Ohio, declared itself in favor of repeal of excise taxes on automobiles and parts, in favor of legislation penalizing the defrauding of battery merchants through wrongful retention of rented batteries, and endorsed its general legislative program calling for equalizing of tax burdens, restrictions under uniform traffic laws, and the strengthening of auto-theft laws.

Trustees elected for the ensuing year were James Henderson, Youngstown; T. R. Dahl, Cleveland; J. R. Burgamy, Cincinnati; C. A. Dunham, Cleveland; F. K. Boggs, Dayton; F. E. McClure, Akron.

Charles Rattermann, of the Rattermann Motor Sales & Service Co., Cincinnati, was elected president for the coming year; Charles E. Doan, Toledo, first vice-president, and O. L. DeWeese, Lima, second vice-president.

The new president called attention to the big work before the association, especially in dispelling the "legislative clouds hanging over the industry."

E. J. Shover was re-elected secretary-manager.

Delegates were entertained at the Champion Spark Plug Co., Friday noon, and at the Willys-Overland plant in the afternoon. John N. Willys addressed the gathering at the Overland Administration Building banquet Friday night.

JORDAN DEALERS ORDER 4350 CARS

CLEVELAND, Dec. 9—Four hundred dealers of the Jordan Motor Car Co., in convention at the Winton Hotel this week, placed orders for 4350 Jordan cars at a total valuation of \$10,800,000 for delivery during December, January, February and March. Every section of the United States was represented, and from every distributor came reports of increasing business with strong emphasis on the increased demand for enclosed cars.

The Jordan Co. will build approximately 9000 cars in 1922. The demand for enclosed cars has brought the requirements of dealers far beyond the present capacity of the factory supply. This means that Jordan production will run for the next four months at the rate of not less than 1000 cars a month, it is said.

Chicago Dealers Prepare to Celebrate Opening of New Row

Michigan Avenue, Widened, to Be Lane of Gaily Decorated Automobile Salesrooms

CHICAGO, Dec. 8—Chicago automobile dealers located on Michigan avenue are preparing to celebrate the opening of the widened avenue, work on which has been practically completed, by decorating their fronts and salesrooms for the week of Dec. 16 to 23, and with a parade and evening program on Dec. 19.

The widening adds 14 feet to the avenue which is Chicago's most heavily traveled automobile boulevard. The widened portion extends from Twelfth street to Thirty-third street, through the whole of "automobile row." The improvement was accomplished by setting the curb back seven feet on each side without disturbing the building line and without unduly narrowing the sidewalks. It greatly facilitates traffic and adds to the convenience of persons having business with the various automobile and accessory stores along the street.

The automotive merchants on the "row" will have a banquet for members of their firms and their employees at the Lexington Hotel at 6:30 p. m., Dec. 19, and later in the evening they will stage a mardi gras celebration throughout the length of the row. The smooth pavement will be roped off for dancing and the public will be invited to come in costume and in holiday mood for confetti, whistles, ticklers and all that goes with a carnival. An automobile will be awarded as a prize to the woman in the best costume. Many other prizes will be given.

The occasion will be utilized to the full advantage, according to members of the Chicago Automobile Trade Association, to attract public interest to the wonderful automotive stores lining the street and it is confidently expected that a considerable stimulation of sales will result.

POWER FARMING DAY AT FAIRS

CHICAGO, Dec. 9—A resolution favoring the designation of one day at State Fairs next year as "Power Farming Day," was adopted by the International Association of Fairs and Expositions at its 32nd annual meeting recently at Toronto, Ontario, Canada. This resolution was in connection with one endorsing the work of the National Institute of Progressive Farming, which has headquarters in Chicago. Members of the resolutions committee were Herman Roe, Minnesota State Fair; N. R. Hirsch, State Fair of Louisiana; E. W. Watts, Oklahoma Free State Fair, and A. M. Hunt, Western Fair, London, Canada.

Gradual Decline of Sales, But Business at Good Level

Cook County Dealers Find That Interest in Automobiles Is High

CHICAGO, Dec. 9—Although retail sales of automobiles have declined steadily in Chicago and Cook county for the last three months, the rate of decline has been so gradual that business is still maintained at a level which dealers generally consider satisfactory for this season of the year. Public interest in automobiles is high and dealers whose sales have shrunk considerably have no lack of prospective buyers, many of whom are waiting until after the first of the year.

A good many buyers have placed orders for Christmas delivery. This is especially true in the higher price field and of course the enclosed cars predominate in this business. There are dealers who are unable to get enough enclosed cars to fill their orders. There is one kind of open car which continues in high favor despite the coming of winter. That is the new sport car, many handsome models of which have been brought out by the various manufacturers. But like the enclosed cars, production of these has been somewhat limited.

Some enterprising dealers are creating a profitable market for new and used open cars by equipping them with handsome and comfortable winter enclosures. One Chicago distributor of a popular line of cars has gone extensively into this winter enclosure business. This company has patented its own design of winter enclosure, the sides of which are constructed with rattle-proof metal frames and a maximum of glass, with well-fitted doors and windows that open easily for ventilation. This equipment may be installed with the ordinary soft collapsible top or with a special permanent soft top. It has met with great fa-

vor and the company maintains its own shop in which it manufactures between 40 and 50 of these outfits each week.

There are indications that January business will open well. Some dealers report a considerable number of orders placed for January delivery. The distribution of bonuses and dividends by many large business concerns is expected to give considerable stimulation to automobile buying.

The present trend of buying is fairly well indicated by figures furnished by the Central Automobile Financing Association which keeps a record of all time-payment sales for which official documents are recorded. These sales are estimated to represent between 65 and 75 per cent of all retail sales in Chicago and Cook county.

For the four weeks ending Dec. 2, the number of such sales was 2,240, or an average of 558 a week. For the four weeks ending Nov. 4 the number was 2,691, or an average of 672 a week. For the four weeks ending Oct. 7 the number was 3,060, or an average of 765 a week. This shows the tapering off in demand, although the decline in these figures was somewhat greater than the actual decline in sales because of the fact that since the \$50 Ford reduction in October a greater proportion of Ford sales have been for cash.

The four weeks ending June 3, last, at the high water mark of the season, showed 4,275 time sales recorded, or an average of 1,068 a week. This was nearly double the weekly average for the last month. The chart reproduced herewith shows graphically how sales in Chicago have fluctuated since the first of the year.

CHALMERS SOLD BY RECEIVER

DETROIT, Dec. 9—The plant and properties of the Chalmers Motor Co. were sold at receiver's sale Thursday, Boyd G. Curtis, representing the note holders committee for \$1,987,600. There were no other bidders. Bids for the property in separate parcels also by Curtis were dismissed in favor of the bid for the whole property.

One-Third of Overland Buyers Are First Owners

Same Percentage Applies to Willys-Knight Purchasers for October —Farmers Lead

TOLEDO, O., Dec. 11—One-third of the purchasers of Overland cars in the month of October were people who, prior to buying their Overland, did not own any make of automobile before. The same percentage holds true in Willys-Knight cars for that month, according to the monthly vocational chart issued by the statistical department of the Willys-Overland Co.

Former owners of either Overland or Willys-Knight cars ranked second in volume of purchases, one-fourth of the monthly total of sales on Overland being to former Overland owners and one-third of the total purchasers of Willys-Knight cars being former owners of Willys-Knight or Overland cars.

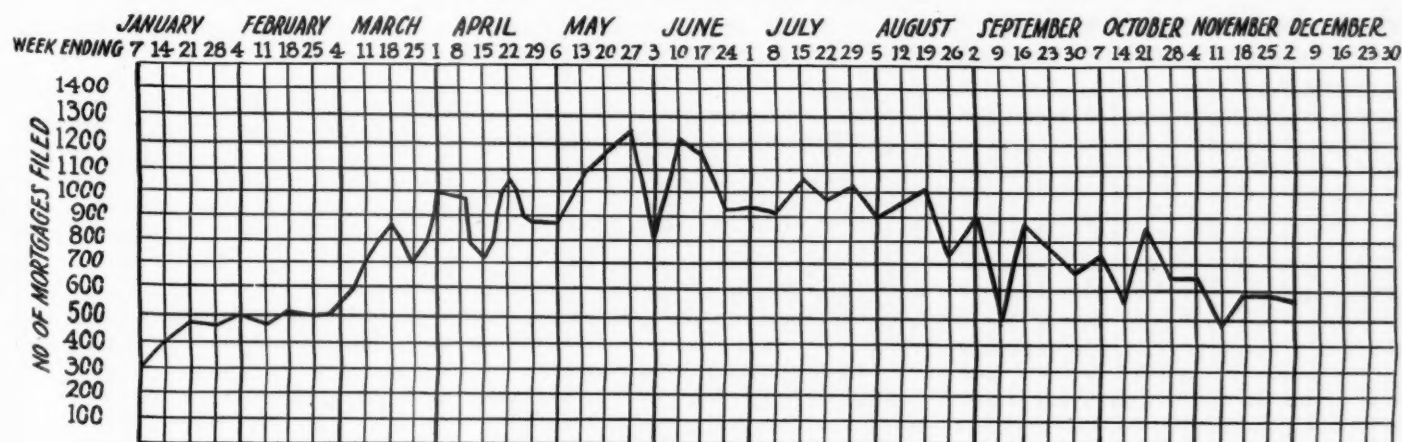
In third place in rank of former ownership on purchases of both cars are former owners of Ford cars, one-fourth of the total sales of Overlands being to former Ford owners and one-eighth of the total sales of Willys-Knight cars being to Ford owners.

Farmers, merchants, laborers and salesmen as classes were the largest class buyers in the order named.

HASSLER DISTRIBUTORS MEET

INDIANAPOLIS, Dec. 9—A four day convention of Hassler distributors was held here this week and attended by about 100 distributors and dealers of Robert Hassler, Inc. Plans for the coming year were discussed and after two days of open sessions, two days were given over to smaller conference with groups. It is said that practically all present look forward to even greater progress than has been made during the present season that surpassed all previous records.

An Index of Sales in Chicago



This chart, based on the number of chattel mortgages filed weekly as security for automobiles sold on the time payment plan, shows the trend of retail automobile sales in Chicago since Jan. 1. The figures were furnished by the Central Automobile Financing Association, Chicago

Rubber Growers Association to Send Committee to U. S.

Londoners to Confer With Americans on New British Rubber Laws

NEW YORK, Dec. 9—The Rubber Growers' Association of London will send a committee to this country shortly after the holidays for the purpose of conferring with the special committee appointed by the Rubber Association of America on the new British restriction act limiting the production of crude rubber.

When this act went into effect, Nov. 1, the American association cabled to London asking for an international conference on the subject, fearing the effects of restricted production on the American tire industry. The British association suggested waiting until both sides had had a chance to see how the new idea would work out before meeting, but evidently both are agreed that it would be best to get together as soon as possible.

It is acknowledged that this restriction act is the main reason for the price of crude rubber soaring to 27 cents, where it is today. It was as low as 10 cents once within the past year and most of the present tire prices were made when it was selling at from 15 to 17 cents. Since Nov. 1, however, there has been a gradual increase until the present level was reached and even now it cannot be safely predicted that it will not go higher.

Americans fear that this restriction act may attract the speculators and it is pointed out that a speculative rubber market would greatly hamper the big industry in this country. It would be impossible for tire makers to continually change prices in an effort to meet costs on materials, so the conference between the two associations will discuss a modification of these restrictions to meet the mutual interests of both grower and manufacturer.

A. S. A., Philadelphia, Hears President of Autocar Company

PHILADELPHIA, Dec. 11—David S. Ludlum, president of the Autocar Co., Ardmore, Pa., addressed the members of the Automotive Service Association of Philadelphia at its monthly meeting, on the value of service, stressing the importance of efficient standardized service in all branches of the automotive industry. There were sixty-five in attendance.

Ludlum asserted that service for a truck or a passenger car is as important as the proper manufacture of the vehicle and is one of the best sales arguments that can be used. He also said that distributors should not give free service, but should receive adequate compensation for whatever they do and that he believes the car owner who has been prop-

erly educated will not expect any different condition.

J. B. Dickson, president of the association, announced that provision has been made for the appointment of a legislative committee to take up with the local chamber of commerce the question of better traffic regulation by the city and state authorities.

Armored Tank Swims Hudson River in 45 Minutes

NEW YORK, Dec. 9—A public test of Walter Christie's armored tank was made Monday which was closely observed by engineers and army officers. This demonstration included traveling along Riverside Drive at the rate of 25 m.p.h., climbing the lower slope of the Palisades and then crossing the Hudson river under the tank's own power.

This armored tank or truck was invented by Walter Christie, formerly a well-known race driver. Christie's vehicle is built by the United States Mobile Ordnance Manufacturers and looks like a combination tank and truck. It has six sets of double wheels. The rear set does not touch the ground when the machine is running on a highway as a truck. When rough country is encountered, a caterpillar tread is attached, making the vehicle really a tractor. Attaching propellers to shafts at the rear makes it a power boat.

The most sensational feature of the demonstration was the crossing of the Hudson river at a point which is two miles wide. Despite a strong ebb tide, the tank swam the river in about 45 minutes.

ALLISON TAKES WINTON

CHICAGO, Dec. 9—One of the most important changes on Chicago's automobile row is that whereby the Allison-Rood Co., of which H. M. Allison is president, relinquishes the Lincoln and Ford and takes over the distribution and retail sale of the Winton and the wholesale distribution of the Columbia in the Chicago territory. The Winton formerly was represented in Chicago by a factory branch which has been closed. The Columbia was represented by the Middle States Motors Co., which has passed out of existence.

GLASS PLANT AT RIVER ROUGE

DETROIT, Dec. 9—The glass manufacturing plant of the Ford Motor Co. will be located at River Rouge, officials have decided. The present plant at Highland Park, at which experiments with glass production were made, will be abandoned when operations at the Rouge begin.

BIRMINGHAM NEWS SHOW

BIRMINGHAM, Ala., Dec. 9—The Birmingham News will open its second annual Closed Car Show on Monday, Dec. 11. This show will be under the direction of Julien Schwarz, automotive editor of the News.

Indiana Meeting to Be One of Most Important Sessions

Legislation and Bills About to Be Introduced Will Be Topics

INDIANAPOLIS, Dec. 9—The state convention of the Indiana Automotive Trade Association to be held here Dec. 12 promises to be a very well attended meeting, and one of the most important automotive trade sessions ever held in the state. The Indianapolis Automobile Trade Association is co-operating with the state body in giving the convention and a large delegation of local dealers is expected to sit in and help formulate plans for future work of the organized dealers of the state.

The legislative situation of the state and the large numbers of bills touching automotive matters expected to be introduced at the coming session of the state legislature makes the meeting of unusual importance. Besides the increase in automotive license fees now expected for next year and a gasoline tax, for which there seems an unusual public demand, several other automotive bills that will directly affect trade affairs are rumored as certain to be presented to the law makers. One of these would lay a large license or tax upon all motor vehicle dealers of the state; and there is also a rumored bill that will attempt to make it unlawful for others than druggists to sell denatured alcohol for anti-freezing mixtures. Also it is understood that attempts will be made to force liability insurance of some form on all motor vehicle owners.

The directors of the state body will meet Dec. 11 to complete arrangements for the meeting and to make plans to lay before the convention so that the one-day sessions may take decisive action on many matters that will be presented to it.

\$25,000 to Be Spent in Investigation of Rubber

WASHINGTON, Dec. 9—A sum of \$25,000 will be expended by the Bureau of Standards in the investigation of rubber to develop standards of quality and methods of measurement, during the fiscal year ending July, 1924. This sum is recommended by the Budget Committee in the budget filed yesterday with Congress.

A large part of the sum will be spent in the development of tires and research in this field. Hundreds of tests were made by the Bureau during the present calendar year for various rubber tire manufacturing concerns and the money for the new fiscal year will enable a continuation of the research work in this field.

65,000 Is Paige and Jewett Schedule for the Year 1923

Production This Year Will Double Best Previous Year, Say Officials

DETROIT, Dec. 11 — Paige-Detroit Motor Car Co. and Jewett Motors has scheduled 50,000 Jewetts and 15,000 Paiges as its production in 1923 about 40 per cent of which are expected to be enclosed cars. This new total will be about 100 per cent more than 1922 production.

Production this year, the company declares, will double the best previous year the company has had.



H. M. Jewett, President of Paige-Detroit Motor Car Co.

To provide for increased manufacturing, the company has taken over the former plant of the Hinkley Motor Co. and will devote it exclusively to Paige assembly. Formerly both Paige and Jewett models have been assembled in plant No. 1 and this building in the future will be devoted to Jewett only. Under the new plan the company will specialize two entirely separate groups of employees on the two models.

With the addition of the Hinkley building, the company will have seven plants in the southern section of Detroit. The two main plants, in addition to those above, are for the manufacture of the Jewett engines and the painting and trim buildings.

Little Motor Kar Co. Is In Production on Trucks

DALLAS, Tex., Dec. 11—The Little Motor Kar Co., Ltd., of this city, which came into prominence two years ago when its president, W. S. Livezey, was indicted on a charge of using the mails to defraud and later given five years in the Federal penitentiary at Leavenworth, has resumed operation after being closed down for more than a year. The company is operated under a board of trustees for the stockholders.

It is not turning out the Little Motor Kars, as originally designed, but is making trucks, road machinery and pumps. The company has just turned out a light motor truck which has been put to severe tests. This truck has not been given a name, but will be assigned one shortly.

WILLYS-OVERLAND INVENTORY

TOLEDO, Dec. 11—The Willys-Overland Co. has finished its annual inventory taking period which has been moved up several weeks earlier to enable the plant to get started on its 1923 program. Previous to the inventory, 5,925 men were at work at the plant.

From the early commitments of branches and dealers for both automobiles and parts it is indicated that 1923 will undoubtedly top the successful present year for production at the Toledo plant.

Care in Operation of Postal Trucks Ordered

WASHINGTON, Dec. 11—Instructions have been issued to postmasters throughout the country to use greater care in the operation of government owned trucks. H. H. Billany, fourth assistant postmaster general, declares that the mere fact that employees of the postal service officially engaged in the transportation of mail are not, under certain conditions, amenable to state and local laws does not mean that an employee may operate a vehicle in a reckless manner and still retain his connection with the postal service.

Billany says: "While it is appreciated that schedules have to be maintained and the collection and delivery of mail expedited, the vehicles engaged in the three activities cited must be operated with care. No schedule is so 'tight' that reckless driving is necessary to maintain it, and where recklessness is indulged in it usually results from the unnecessary loss of time at the starting point, which loss the operator attempts to make up somewhere along the route."

PORTLAND MECHANICS' COURSE

PORTLAND, Ore., Dec. 7—Portland's regular winter course in automobile mechanics, held under the auspices of the extension department of the Oregon Agricultural college, and run entirely free to all who wish to attend, opened last week with the largest enrollment in its history.

The course is open to all journeymen mechanics of Portland and vicinity, and is held one evening each week for two hours, from 8 to 10 P. M., when lectures, illustrated with lantern slides, diagrams and in some cases actual parts, are given.

WILL ROGERS TO TALK

NEW YORK, Dec. 11—Will Rogers is going into the automobile business, for one night. He will be one of the two speakers at the annual dinner of the National Automobile Chamber of Commerce to be held in the Hotel Commodore, New York, Jan. 9. This expert lariat thrower and humorist will talk on the subject "What I Think About Automobiles."

NO LULL FOR CADILLAC

DETROIT, Dec. 11—Because of the large increase in business following its recent price cut, the Cadillac Motor Car Co. will not close for inventory two weeks the first of the year as planned. Instead, H. H. Rice, president, said, the company will continue at full force and additional workmen will be taken on.

Receiver Is Asked for the Saxon Motor Car Company

Action Follows Attempt to Re-finance Firm by Sale of 200,000 Shares of Stock

DETROIT, Dec. 9—Naming of a receiver for Saxon Motor Car Co. was asked in Federal court here this week, pending action on a bankruptcy petition filed by three small creditors of the company. In the petition it is declared that the company has not been in operation for some time and that the plant at Ypsilanti has been left without any responsible person in charge. The petitioners are Wire Wheel Corp., Detroit Insurance Agency and the Publicker Commercial Alcohol Co., whose claims aggregate \$3400.

Officers of the company said the action of creditors was not unexpected in view of the failure of the financial plans of the company. Stockholders authorized 200,000 additional shares of stock on Aug. 3 last and arrangements were made for their sale. This would have placed the company in position to continue manufacturing, but market conditions made the quick sale of the securities impossible.

With the new money the company had planned to exhibit new models at the national shows this winter and to develop its business for 1923 on the new cars. These were six-cylinder models to sell at about \$1000 and had been fully developed. Failure of the sale of the stock made it impossible for the company to continue with its plans and the plant at Ypsilanti has been completely closed for upwards of several months.

Law Makes Great Effort to Reduce Number of Accidents

NEW YORK, Dec. 9—Evidence is at hand to show that law enforcement officials throughout the country are making determined efforts to reduce the number of automobile accidents by compelling motorists to drive carefully and sanely. A judge in Detroit made the lesson sink home by compelling drivers who had caused accidents to visit one of the hospitals and look at children who had been maimed by automobiles. Indianapolis has adopted strenuous methods, too, Mayor Shank having ordered that hereafter all motorists arrested for violating the speed ordinances shall be hauled to jail in patrol wagons and each compelled to give a \$5000 bond.

Los Angeles is compelling respect for the law by sending motorists to jail for 10 days. One of the most prominent of those to suffer such imprisonment is Ralph De Palma, who is now serving a 10-day sentence for speeding. The judge permitted De Palma to drive in the big race last Sunday before going to jail.

Handley Motors, Inc., Takes Over Handley-Knight Business

600,000 Shares of No Par Value Stock Authorized for Capital of New Company

KALAMAZOO, Mich., Dec. 9—Handley Motors, Inc., with an authorized capital of 600,000 shares of no par value has been organized and has taken over all the assets, including cash on hand, inventories, receivables and plant, of the Handley-Knight company.

Incorporation papers of the new company were filed at Lansing on Dec. 1, and all the necessary papers were signed and title passed, transferring the assets of the old company to the new company, on Dec. 2.

The incorporators of the new company are James I. Handley, W. E. Upjohn, Charles A. Blaney, C. S. Campbell, W. H. Conklin, R. J. Fitness and C. V. Kean, Jr.

Future plans of Handley Motors, Inc., provide for the manufacture of the same Handley-Knight de luxe chassis, with a six cylinder engine instead of the four cylinder heretofore used, and a smaller six cylinder car now being developed. The development of the new smaller car is pretty well along, and it will be ready to show, in connection with the larger car, at the National Automobile shows, in New York and Chicago. The smaller car is expected to sell for about \$1250.

"OVERFLOW SHOW" FOR N. Y.

NEW YORK, Dec. 9—In no sense a competitor of the national show in Grand Central Palace but designed to take care of the overflow, the show being promoted by William H. Wellman in Madison Square Garden Jan. 8-11 is making considerable headway, Wellman reports. Space reservations have been made for the Coats steamer, the Detroit Air-Cooled car and the English Sunbeam, while some of the truck manufacturers appear interested. Manufacturers of taxicabs and motor buses also see in the Garden affair an opportunity to display their wares before a New York audience and bookings already have been made by the Yellow Cab, Checker Cab and Driggs. Wellman is making headquarters in Room 1409 World Tower Building.

NEW DEALER QUARTERS

CINCINNATI, Dec. 10—The Cincinnati Automobile Dealers' Assn. has leased rooms in the Havlin Hotel, through the courtesy of the Cincinnati Automobile Club. The dealers' organization explains that this move is simply to better their location and that they are not in any way affiliated with the club. A. C. Kistner, Dort and Haynes agent, is the newly elected secretary-treasurer.

F. J. Santry, president of the Nash-Cincinnati Motors Co., has inaugurated a sort of "recess" plan for the men in the shop by which at a certain hour in the morning and afternoon a bell rings and the men are allowed to smoke or talk

in a room set aside for this purpose. Very often the recess period is taken up by a talk by one of the service managers.

Man Hired as Salesman Disappears With Car

FORT WAYNE, Ind., Dec. 8—The E. W. Steinhart Fort Wayne Co., Cadillac and Oakland dealers at Fort Wayne, recently suffered the loss of a new Oakland phaeton which was driven away by a man who had been given employment as a car salesman.

This man, giving his name as C. H. Caig, applied for a position as salesman about Nov. 1. He claimed to have worked for automobile dealers in Toledo, O., and other cities. He was very familiar with automobiles. On Nov. 27 he disappeared with one of the company's Oakland cars. The car number was 9307 and the engine K-9722. The car bore Indiana dealer's license M-88. Caig is described as about 35 years old, 145 lbs. in weight, slightly stooped, with blue eyes, light complexion and a slight limp in his right foot. The company offers a \$50 reward for recovery of the car and states that there is a reward offered for the arrest of Caig on a forgery charge.

REPUBLIC RECEIVERSHIP

DETROIT, Dec. 8—The receivership of the Republic Motor Truck Co. has been extended to cover a claim of \$2,500,000 filed by the Bankers Trust Company of New York and the Guardian Savings & Trust Co. of Cleveland. The claim is secured by a mortgage held by the company, covering plants, factory, machines and equipment at Alma and some real estate at Euclid, Ohio. The mortgage is declared to be in default and foreclosure sale is sought.

Security Trust Co. of Detroit, the receiver, has been authorized to issue \$100,000 in receiver certificates to maintain continued operation of the plant.

The Republic Truck Sales Corp., the selling organization, is not affected by the proceedings in which the manufacturing company is involved.

FACTORY BUILDER KILLED

DETROIT, Dec. 10—W. E. Wood, head of the E. E. Wood Construction Co., which has built many of the important automobile plants of the district, and widely known in the industry, was killed when his car skidded into a ditch near Flint, Friday. He founded the Wolverine Tractor Co., which operated in Saginaw several years ago, and besides his construction work, was interested in or owned, several large parts companies and warehouses.

He is credited with the construction of the Ford and Dodge plants, Detroit; the Buick plant, Flint, and several other large automobile plants. He was an intimate friend of W. C. Durant, and was a part owner with him in a large tract of cut-over timber land which they used as a private hunting preserve.

Increase in Sales in Texas for December Is Reported

Many Dallas People Are "Giving a Car for Christmas," Say Dealers

DALLAS, Tex., Dec. 11—There appeared to be a slight increase in retail automobile sales in Dallas during the first part of December. This was due, dealers say, to the fact that many Dallasites are "giving an automobile for Christmas." During the first days of December a dozen dealers in the city announced that they had booked a half dozen cars for delivery Christmas morning. That meant 72 automobiles for Christmas gifts already. The dealers said there would probably be five hundred cars sold for Christmas presents in Dallas.

The regular trade was holding its own. There has been no severe weather and the use of motor vehicles now is as prolific as in the summer. Dealers reported the sales brisk, with the demands and inquiries indicating the month would be as good as any of the year.

The tire dealers reported increased trade. The accessory men said their business was normal and the garage-men were kept busy all the time.

The retailers and the distributors said the prospects for trade another year are brighter than they have been for two or three years.

AMERICAN CHAIN WINS SUIT

SAN FRANCISCO, Dec. 8—By a decision of Judge H. M. Wright of Los Angeles, Special Master in Chancery, the American Chain Co. wins its suit against the Chester N. Weaver Co. of San Francisco, involving the validity and priority of the Hoover spring bumper as against that of the Lyon bumper, which is declared an infringement on the Hoover patent. An accounting of profits accruing from the sale of Lyon bumpers from 1916 to 1922 is ordered.

NO GASOLINE TAX

SALT LAKE CITY, Utah, Dec. 10—It looks as if Utah will not have the gasoline tax which was anticipated. The defect of the constitutional amendment providing for the classification of property for taxation purposes may prevent levying the tax, in the opinion of Wm. Bailey, chairman of the state tax commission. Bailey said that, therefore, the present tax on automobiles as personal property must remain because of constitutional provisions.

REO ASSETS INCREASE

DETROIT, Dec. 8—Total assets of the Reo Motor Car Co. are \$16,238,864.86 and current liabilities as \$2,783,025.68, according to the financial statement as of Aug. 31. The assets have grown \$4,000,000 over 1921 and liabilities have been decreased. Net profits for the fiscal year were \$3,140,529.96.

CONCERNING MEN YOU KNOW

Forrest J. Alvin retires Jan. 1 as general manager of the United States Motor Truck Co., Cincinnati. Alvin has no definite plans for the future, but is retiring on the advice of his physician.

F. A. Wirt, formerly professor of agricultural engineering, University of Arkansas, has joined the advertising department of the J. I. Case Threshing Machine Co. He will be engaged in sales promotion and advertising work. He comes to his new work experienced in the use of farm machinery in the field, building and erecting it in the factory and selling it to the dealer and user.

Frank C. Mattern, manager of Dort New York branch, has resigned and will be succeeded by G. R. Teaboldt, who has been connected with the Dort company in foreign and domestic sales work for the past two years. Teaboldt is an old timer in the industry, being first connected with Thomas and later with Packard and then assistant general manager of Gaston, Williams & Wigmore.

Westcott Motor Car Co. of Springfield, O., announces the appointment of Carl O. Schreiber as assistant to the president, in charge of factory operations.

L. J. Campbell of the Campbell Transmission Co., Buchanan, Mich., has returned from a three months' business trip to France, where he completed the organization of the Societe Francaise des Changement de Campbell, which will manufacture Campbell transmission in that country. This country has purchased a fully equipped factory which will manufacture the Campbell device for French vehicle developments.

E. D. Davis, who has been prominently connected with the automobile industry in Nashville, Tenn., has recently made a connection with the United Motors Corp., Star and Durant distributors for middle Tennessee, and will hereafter cover that territory for them.

Benjamin Drewes, superintendent of foundries, Kissel Motor Car Co., Hartford, Wis., has resigned to accept the position of assistant general foundry superintendent of the Fairbanks-Morse Mfg. Co., Beloit, Wis., under R. J. Barr, in charge of the casting shops of this industry.

William D. Martin has been appointed assistant general manager of the Kenosha, Wis., works of the American Brass Co., division of the Anaconda Copper Co., to fill the vacancy caused by the resignation of James R. Anderson.

H. C. Greenleaf, who has been connected with Butler Bros. for 16 years and as buyer of automobile accessories for the past six years, is making a change and taking charge of their furniture department.

E. A. DeWaters, chief engineer of the Buick Motor Co., has returned from a tour of the leading automobile factories in Europe and the London and Paris shows. He was highly pleased with the favor in which he found American motor cars were being received abroad.

E. Le Roy Pelletier, well known for many years in the automotive industry, has been appointed advertising manager in charge of sales promotion of the Rickenbacker Motor Co. Pelletier, a former newspaper man, entered the automotive industry in 1901 as designer of the Duquesne, an air-cooled car, and as president of the company which built it. He was later associated with Henry Ford as consulting engineer and still later as private secretary and publicity manager.

R. D. Brown has been appointed general sales manager of the Painter-Dunn Co., Pittsburgh, Pa., distributors of the Pierce Arrow.

J. F. Gibbons, formerly in charge of the wholesale department of Apperson Motors, Pittsburgh, Pa., has been made assistant manager of the Apperson Bros. factory branch in Pittsburgh.

T. E. Meyers Sails for U. S. After Six Weeks in Europe

INDIANAPOLIS, Dec. 8—T. E. Meyers, secretary and general manager of the Indianapolis Motor Speedway, sailed for New York Dec. 6, en route to Indianapolis, after about six weeks of European visits in search of prospects for the eleventh annual international 500-mile race to be held here May 30, 1923, for 122 cu. in. cars. Cable reports indicate that he has had a very successful trip and that there will be a big foreign contingent in the next 500-mile race. It is said that his visit to foreign factories found them very enthusiastic regarding the chances of European cars to make a good showing in the 122 in. class and that several new names will be in the entries from that quarter.

Contrary to the current opinion, it is also said that right now there are more American prospects for contenders in the next race than the speedway has ever had so far in advance of the closing time for entries. No details of additional formal entries can be obtained but the prediction is freely made here that the 122-in. class will have the largest number of formidable contenders ever seen at the Indianapolis brick track.

ELCAR MAKES DIAMOND CABS

ELKHART, Ind., Dec. 11—Contracts have been signed by the Elcar Motor Co. of this city and the Diamond Taxicab Co. of New York City under which the local concern will build the vehicles which will be operated by the New York organization. The Diamond company's initial order is for 1000 taxicabs of the

landaulet type and it is expected that the first shipment of five carloads will go east within a week. The cab is the creation of A. M. Graffis, the Elcar engineer, and the feature of it is an adjustable top which can be quickly lowered without interfering with protection from wind and dust from any angle. After the New York installation, the Diamond company plans to invade other big centers like Boston, Philadelphia, Washington and Baltimore.

CHARLESTON CONVENTION, DEC. 12

CHARLESTON, S. C., Dec. 9—H. Lee Harvey, of Charleston, president of the South Carolina Automotive Trade Assn., has announced the date of the annual convention, which will be held this year in Spartanburg on Dec. 12. The association will be the guest of the Spartanburg Chamber of Commerce. There will be a session at noon, another at 4 o'clock and a banquet at 8 o'clock, at which Governor-elect McLeod will be the principal speaker. The convention is being thrown open to all dealers whether they are members of the association or not. Carl Page of the American Motors Corp. of Plainsfield, N. J., will be one of the speakers at the convention.

REPUBLIC ASSETS EXCEED DEBTS

DETROIT, Dec. 8—According to the Security Trust Co., of this city, receiver for the Republic Motor Truck Co., of Alma, Mich., that concern showed assets of \$6,289,930 and liabilities of \$5,181,862 on Sept. 28. The excess of tangible assets over liabilities exclusive of capital is \$1,108,068.

Automotive Sales in Greater Volume Throughout Southeast

Truck and Tractor Business Much Better Than This Time Last Year

ATLANTA, Ga., Dec. 11—Commercially, industrially and financially the southeast is in a better shape at this time than it has been in many years, according to the monthly review of the Federal Reserve Bank of Atlanta, covering conditions in the sixth district.

Of the important lines of wholesale and retail trade reporting every one showed an increase the past two months as compared with two preceding months, and a substantial increase as compared with the same period in 1921, including automotive and accessory dealers, farm implements and tractors. Virtually all manufacturing industries reported the same, and a shortage of labor for the first time in years. Financially the district has plenty of money due to the excellent crop prices this season, and bank clearings in all important southeastern cities are considerably larger than at this time a year ago.

Automotive sales all along the line—that is, higher priced as well as medium and lower priced cars—are in larger sales volume than for months, with the 1923 outlook, so distributors advise the bank, portending another inflation period. They believe, however, this inflation period will be on a more stable basis than that of 1919, and not followed by the long months of deflation.

Tractor, implement and truck sales were considerably better in October and November this year than 1921, though the usual seasonal decline in tractor and implement sales is, of course, being noted. The 1923 spring outlook for tractors and implements for the entire south is the best it has been since the latter part of 1919 distributors here advise.

Appraisal of C. H. Wills Co. Starts; Ample Cars on Hand

DETROIT, Dec. 9—Work of appraising the plant and properties of the C. H. Wills Co. will be started next week and will be completed, if possible, by Dec. 20. Manufacturing operations at the plant have been discontinued for the present except for the work of completing cars in process of manufacture. It is the intention of the receiver to begin major operations again the first of the year.

Cars now on hand and in process will be ample to meet sales requirements for the present, the receiver said. It is hoped to bring the receivership to a speedy termination, and a sale will be held soon after the first of the year. In the meantime the business will be operated on a sales basis, and all orders from dealers will be filled without delay.

IN THE RETAIL FIELD

Harry P. Branstetter, Kissel distributor in Chicago, has opened a new retail sales room at 2538 S. Michigan avenue. The wholesale, used car and service departments will be continued at Wabash avenue and Twenty-sixth street.

L. H. Damman Motor Co., Davenport, Ia., has secured the local agency for the Gray car and will add it to its salesroom display. Damman Motors also handle the Mitchell.

Frank T. Court has leased salesroom and building of M. S. Carver in Independence, Ia., and will conduct an automobile agency and garage there under the name of the D. & S. Auto Co.

Lange & Tschanner Motor Car Co., Dubuque, Ia., has been made distributor for the Durant and Star in five counties. G. W. Joseph has been appointed sales manager for the company.

W. J. Roberts, who has been identified with the Pierce-Arrow organization for many years, has been appointed distributor for the Pierce-Arrow cars in the Cleveland territory. The W. J. Roberts Co. is being organized and it will take over the present sales and service quarters at E. 46th street and Carnegie avenue.

The R. J. Schmunk Co., distributor for the Hudson and Essex motor cars in the Cleveland territory is to have a new home at 3746 Prospect avenue. The company has taken a five-year lease at \$25,000 a year rental with option to renew for another five years at \$27,500 annually and an option to buy the 99-year leasehold for \$250,000.

Torbert-McGregor, Inc., 1203 Harmon place, Minneapolis, distributing the Durant and Star cars in the northwest, staged a noonday parade of news cars Nov. 27, 28 and 29 downtown. This company has adopted the community center sales plan similar to that used by the Pence Automobile Co. The local sales agents are: Harper-Shourt Motor Co., 219 Sixth street S.; Central Motor Sales Co., 24 Fourth street E.; Sneed Crawford Motor Co., 3025 Hennepin avenue; Swedell Auto Co., 2920 27th avenue S.; Grand Auto Garage, 713 W. Broadway.

The Northside Motor Car Co., Cincinnati, O., has been incorporated with a capital of \$5,000 to deal in cars and accessories.

The following are new Dort dealers: I. E. Bamberger, Lebanon, Pa.; S. J. Webster, Muskegon, Okla.; T. H. Douglas, Bakersfield, Cal.; Braun-Stecker-Stevens, Inc., Los Angeles, Cal.; Merrill Garage & Vulcanizing Co., Merrill, Wis.; Jess D. Akin, Farmington, Minn.

Paul A. Simpson and Richard H. Young will open a Rent-a-Ford business at 716 Sycamore street, Waterloo, Ia. They have also purchased and will operate the Quality Tire & Service Co. at that place.

Quigley Motor Co. of Cedar Rapids, Ia., has rented the A Avenue Garage at 203 A avenue.

Miley Bros., of Chariton, Ia., have opened a branch office at 115 W. Second street, Ottumwa, Ia. Reo cars will be handled, with B. B. Merger as manager.

The Elcar Motor Sales Co., Philadelphia, has organized to handle the Elcar in Pennsylvania, Delaware and southern New Jersey. R. Ramsay, president, and Frank Fisher, vice president, have had many years of experience in the automotive industries.

H. D. Shawkey, distributor of the Durant, Star and Locomobile in the Pittsburgh, Pa., territory, has taken a lease for a long term on a new sales building to be erected for him at Penn and Pacific streets. The building is to be ready by March 1.

The R. E. Loughney Motor Co., distributors of Reo cars at Pittsburgh, Pa., recently celebrated its seventh anniversary. The company has sold nearly \$14,000,000 worth of automobiles and trucks in western Pennsylvania.

Clyde Walker, 522 Portage street, Kalamazoo, Mich., has taken the agency for the Moon car. He also operates a truck delivery service and an automobile livery, having 30 trucks and cars in constant use.

William L. Garrison & Son, 317 N. Edwards street, Kalamazoo, Mich., are successors to R. L. Bixler, as agents for the Nash Motor Car Company's line in southwestern Michigan.

The Fairfield Motor Co., of Fairfield, Ia., has been succeeded by the Brown Motor Co.

The Universal Car Co., of Centerville, Ia., has taken over the business of the Plano Garage at Plano, Ia.

The Nash agency in Sioux City, Ia., has been taken over by the Fleming Motor Co. Salesroom has been obtained in the Warnock Bldg.

The Sioux City agency for Studebaker cars has been taken over by the Murphy-French Auto

Co. Studebakers were formerly handled at Sioux City by the Seeman Auto Co.

Mason Tire & Rubber Co. has selected Des Moines, Ia., as a point of distribution. Joe Dine, formerly general manager of the Madison Tire & Rubber Co., of Buffalo, has been appointed division manager and C. J. Marx, formerly branch manager for Mason at Atlanta, has been transferred to the Des Moines branch.

William B. Nelander, formerly connected with the Duffell Motor Co., has opened a garage between Locust and Grand on Thirteenth street, Des Moines, Ia.

C. G. Cummins, Sioux City Hupmobile dealer, has moved to larger quarters at Eighth and Pierce streets.

The Jaeger-Dowling Co., Ford dealer, Neenah, Wis., is moving into its new \$25,000 sales and service building.

George Richards, 6210 Greenfield avenue, West Allis, Milwaukee county, Wis., proprietor of the Richards Auto & Tire Supply Co., has leased the State Fair Park Garage, 7201 Greenfield avenue, and taken a Buick franchise.

The St. John Motor Car Co., Appleton, Wis., has moved into its new \$25,000 garage and service building, 42x108 ft., devoted to the sale and servicing of the Maxwell, Chalmers and Gray. Clarence St. John, general manager, was for eight years engaged in automotive merchandising and service in Green Bay, Wis.

The Gibson Auto Exchange, Oshkosh, Wis., which recently opened a branch in Appleton, Wis., will build a new building, 47x150 ft., for the branch. The concern deals in automotive equipment, used cars, and operates the Ford Rental Co. and the Gibson Tire Co. G. J. Schwab is manager at Appleton.

The W. H. Krueger Motor Co., 499 Jefferson street, Milwaukee, has been appointed distributor of the Columbia in Wisconsin and upper Michigan. The Krueger company has been for many years distributor of the Cole and retains this connection.

The T. J. Marlier Co., 188-192 Eighth street, Milwaukee, has been appointed distributor of the D-A-C (Detroit Air-Cooled) car in the Wisconsin and upper Michigan territory. Ted J. Marlier, head of the company, has been engaged in automotive service in Milwaukee for more than 15 years.

The Netter-Heiser Co., Ford and Lincoln dealer, Milwaukee, will add two full stories to its present one-story sales and service building, 75x150 ft., at 704-08 Grand avenue.

Stephenson & Adams, Stevens Point, Wis., is a new partnership organized by William Stephenson and J. A. Adams, to become dealer in the Coats Steamer in Portage and Wood counties, Wis.

The South Side Nash Co., Milwaukee, Nash dealer, will build a one-story fireproof sales and service building, 72x92x40 ft., the location of which has not yet been divulged.

Consolidation of interests of the George H. Williams Co., Franklin distributor, 188-90 Eighth street, and the Sanger Automobile Co., Franklin dealer, 485 Jefferson street, Milwaukee, has been announced. The Sanger-Williams Co., has been incorporated in Wisconsin with 1,000 common shares without par value, by George H. Williams and William F. Sanger. The merged concerns will continue business at 485 Jefferson street. The distributing territory embraces the southeastern section of Wisconsin.

The Colley Motor Co. has taken the agency for the Gray in Westfield, Mass.

Clarence M. Wellman has bought the Roberts Garage in Brattleboro, Vt., and will remove his Exide battery station there.

Dario Motor, 215 Main street, Woonsocket, R. I., has been granted Maxwell-Chalmers franchises.

Louis Patenaude of Gardner, Mass., will in the future handle Maxwell and Chalmers.

Palace Automotive Sales Co., Chester, Pa., has been appointed Maxwell dealers here.

Automotive Sales Co., of St. Petersburg, Fla., was recently granted the Maxwell franchise for that city.

Magill Motor Sales, 216 Main street, Monterey, Cal., has taken on the Maxwell line here.

Charles H. Kanehl of Big Rapids, Mich., has been appointed Maxwell dealer.

Rhode Island Motor Sales Co. of Pawtucket, R. I., has been granted Maxwell and Chalmers franchises.

Union Motors, Inc., of Houston, Tex., has been organized to distribute Maxwell and Chalmers

New South Dakota Automobile Trades Assn. Gives Program

Standardization of Service, Adequate and Protective Legislation Are Leaders

HURON, S. D., Dec. 11—The newly organized Automobile Trades Association of South Dakota, of which O. M. Phelps is president, has decided to work on a program for standardization of service, adequate and protective legislation and a high standard of ethics. The legislative program has been outlined as follows:

Passage of a mechanics' lien law which will give the mechanic and repair man doing work on cars 60 days in which to file a lien; this lien not to take precedence over a mortgage, but to amply protect those working on or putting repairs on a car.

Appointment of an automobile committee in both the house and senate of the state legislature to which should be referred all proposed laws affecting the automobile industry. It was pointed out that this is one of the largest industries in the state as well as in the nation, and should be given recognition as such in this manner.

Cooperation with the South Dakota Retail Merchants' Association and other similar state organizations, in securing the passage of a bad check law "with teeth in it," one that would make the uttering of bad checks and the drawing of checks on banks where funds are exhausted, so severe a felony that the practice would soon be stopped.

ANOTHER USED CAR PLAN

DES MOINES, Ia., Dec. 11—In an effort to promote used car sales in the state of Iowa, the Iowa Automotive Merchants' Association is listing average sale prices of used cars.

Dealers are requested to fill out and mail monthly reports covering all used car sales. Average prices for the month are obtained from these reports and listed for the information of dealers. It is believed that this plan will do much to establish standard trade-in values and prevent much of the "shopping" for high trade-in allowances.

cars. George Pearson, Jr., formerly of Union Motors, Inc., Maxwell and Chalmers dealers in Los Angeles, and prior to that coast supervisor for Maxwell and Chalmers, is president and general manager. George Walling is secretary and treasurer.

The Conduitt Automobile Co. of Indianapolis, Maxwell-Chalmers dealers, has started construction on an elaborate new home that will be one of the finest motor car sales and service institutions in the middle west.

Basel Green Co., 2911-15 Indiana avenue, Chicago, has been incorporated to deal in automobiles, trucks, etc.

Proviso Motor Sales, Inc., 700 S. Fifth avenue, Maywood, Ill., has been incorporated with a capital of \$25,000 to deal in automobiles, motor vehicles, etc.

Among new Dort dealers are the following: W. W. Rude, Harrisburg, Ill.; Eugene H. Haskell, Mansfield, Conn., and Joseph L. Carl, Glastonbury, Conn.

BUSINESS NOTES

Liabilities of \$26,630.33 and assets of \$4,062.05 were listed by the Wright Manufacturing Co., makers of automobile accessories, in a voluntary petition in bankruptcy filed in the United States District Court at Louisville, Ky.

Hamilton Body Co. is the name of a new body manufacturing concern at Hamilton, O., chartered with an authorized capital of \$10,000 by Charles E. Schmitt, Robert N. Shotts, Branadon R. Millikin and Robert B. Millikin.

Lee-Ames-Craig-Barlow, Inc., sales representatives at 1507 S. Michigan avenue, Chicago, has taken up the Kil-nock automatic bearing bolt.

C. M. Gassner has been appointed Iowa distributor for Hoo-Dye shock absorbers. Business will be conducted under the name of the Hoo-Dye Co. of Des Moines, at 1419 Locust street.

The Newkirk-Selzer Battery Co. of Sioux City, Ia., has recently placed a line of automobile batteries on the market.

The Kurtz California Top Co., manufacturers of automobile tops, has moved from Marshalltown, Ia., to Des Moines.

A wholesale office of the Chevrolet Motor Co. has just been opened in the Flint Bldg., 219 N. Broad street, Philadelphia, in charge of Harry L. Horton, sales manager, who has supervision of the company's wholesale business in eastern

Pennsylvania, most of New Jersey, all of Delaware and the Delmarvia Peninsula.

The Piston Ring Co., of Muskegon, Mich., is preparing to increase its output from 12,000 piston rings daily to 20,000 a day. This will be accomplished by a large addition to the company's foundry facilities.

The Monroe Body Co., Ludington, Mich., which burned out Nov. 15, is to rebuild on a much larger scale. The Ludington city commission has authorized the purchase of a 500-acre strip of land, near the Pere Marquette railroad, while the concern will also be financially assisted in the erection of its new plant.

Tennant Bros., conducting an automobile financing business with headquarters on Chicago's automobile row, have opened a branch office at 4222 Woodward avenue, Detroit, in charge of J. W. R. Tennant.

The White company has occupied its new service station for trucks at Archer avenue, Wallace street and Twenty-fourth place, Chicago, which has 55,000 sq. ft. of floor space, nearly all on one floor.

Members of the Chicago Automobile Trade Association are arranging for one or more special cars to New York for the New York National automobile show.

Goodyear Contract Which Caused Suit Is Abrogated

New Arrangement Replaces One Pledging 5 Per Cent Profits to Managing Company

AKRON, O., Dec. 11—The contract existing between the Goodyear Tire & Rubber Co. of Akron and Leonard, Kennedy & Co. of New York, providing for payment by Goodyear of \$250,000 a year plus five per cent of Goodyear profits between \$10,000,000 and \$20,000,000 annually for management of the Goodyear Co., and which was made the basis of the suits filed in the Akron courts Aug. 8 by Mrs. Laura L. T. Weiss of Cleveland, in which legality of the entire \$85,000,000 refinancing and reorganization program of the Goodyear Tire & Rubber Co. is attacked, was completely abrogated and discarded on Nov. 24 by Goodyear directors at a meeting held in New York, it has just become known here.

The abrogation of the contract with the Leonard, Kennedy & Co., entered into under date of May 1, 1921, by Goodyear—the date when the company's reorganization program was consummated and when F. A. Selberling, founder of the company, was dethroned as its president, was followed by the writing and entering into by the Goodyear directorate of a new contract with the Leonard, Kennedy & Co., which still provides for the payment of \$250,000 a year but which eliminates the provision calling for payment each year of a bonus of five per cent of profits in excess of \$10,000,000 annually but not in excess of \$20,000,000.

PACKARD DISTRIBUTORS MEET

ATLANTA, Ga., Dec. 11—Eighteen Packard distributors from the southeastern states held a district sales convention in Atlanta two days the early part of this month, the first meeting of its kind the Packard company had held in the southeastern field. R. E. Chamberlain, general sales manager of the Packard Motor Car Co., conducted the conference, which was devoted largely to a discussion of plans for the coming year in this territory. Practically all distributors present expressed themselves as very well satisfied with the outlook. Other Packard factory men present were H. N. Davock, technical service manager, and Charles D. Ten Eyck, district manager. J. H. Sommers, general manager of Packard Enterprises of Georgia, Inc., acted as host to the visiting distributors.

MOTORCYCLE DEALER TAKES DORT

DENVER, Colo., Dec. 11—Floyd Clymer, a successful distributor of motorcycles and head of the Floyd Clymer Mfg. Co., maker of spotlights, has contracted to distribute the Dort car in Colorado. The agreement was negotiated in Denver by Sam C. Mitchell, special representative of the Dort company. Clymer is planning to erect a new building to house his distributing organization.

Packard Increases Dealer Organization 220 Per Cent

DETROIT, Dec. 11—Packard Motor Car Co. has increased its dealer organization 220 per cent in the United States and Canada during the year, giving the company representation in practically every important city. There also has been an increase of 48 per cent in distributors. Part of the increase, it is declared, is due to the discontinuance of branches by both companies and distributors.

As a result of the reorganization, R. E. Chamberlain, general sales manager, said, a number of major changes in distributorships have been made where it was deemed that adequate facilities were not offered. Such changes were made in Buffalo, Pittsburgh, Washington, Baltimore, Toledo, Omaha and a number of cities.

CADILLAC 61 TO BE CONTINUED

DETROIT, Dec. 11—Announcement by the Cadillac Motor Car Co. that the Type 61 Cadillac will be continued on a largely increased production schedule and at materially reduced prices has already brought enthusiastic responses pouring into the factory from distributors in nearly every part of the United States, according to Jay W. Dunivan, Cadillac manager of distribution.

MAKES TRANSCONTINENTAL TRIP

LOS ANGELES, Dec. 4—"Canonball Baker," driving a Neracar—New York to Los Angeles—completed his sixtieth transcontinental trip Sunday, Nov. 19th, at 2:12 p. m.

Baker's total mileage was 3,364.2 miles, using 45 gallons of gasoline and 44.75 pints of oil, at a total fuel cost of \$15.70. His running time was 7 days, 6 hrs. 1 min., or an average of 19.3 miles per hour, and 74.76 miles per gal-

lon of gasoline. This is the smallest machine to ever make this trip under its own power. Total weight of machine, equipment and rider 420 lbs., machine alone 180 lbs.

LORRAINE MOTORS BANKRUPT

DETROIT, Dec. 8—Lorraine Motors Co. has filed a voluntary petition in bankruptcy, showing assets of \$91,038.51 against debts of \$82,322.80. The petition, filed by J. L. Dornbos, secretary and treasurer, lists the assets as \$52,000 in real estate; \$11,579.05 in bills, promissory notes, etc., \$19,025.32 in tools and machinery, and accounts due, \$8,372.50. The debts are practically all unsecured claims, with about \$5000 due on taxes.

MORS IS REORGANIZED (By Mail)

PARIS, Nov. 18—Minerva and Citroen interests are to be found in the reorganized Mors Automobile Co., with a capital of 5,000,000 francs. The managing directors are Andre Citroen, Sylvain De Jong, of the Belgian Minerva Co., and Gustave Clement-Bayard. The Mors company is building two types of cars in its Paris factory, with Knight sleeve valve engines produced by the Belgian Minerva Co. By reason of this arrangement Minerva cars will be marketed in France and its colonies by the Mors company, thus avoiding the 45 per cent import duty against foreign cars.

STUDEBAKER DIRECTORS MEET

NEW YORK, Dec. 9—A special meeting of directors of the Studebaker Corp. ordered a stock dividend of 25 per cent to common stockholders. This distribution will be made on Dec. 29 to holders of record as of Dec. 16. No action by stockholders is necessary as the corporation has authorized common capital of \$75,000,000 of which only \$60,000,000 is outstanding.

The READERS' CLEARING HOUSE

Questions & Answers on Dealers' Problems

Causes and Remedies for Skidding

Q—Advise the causes and methods of overcoming skidding of automobiles. Also what is the basic principle underlying the action of non-skid tires and safety chains?

Our observation has been that cars skid only when brakes are applied, regardless of how lightly, on slippery pavements. Is this correct, or do cars also skid when running normally and without interruption across slippery pavements? The common remedy of releasing brakes and making an effort to continue in a direct course would indicate that the first theory is correct. Give all the information you can on this subject.—C. G. Olson, Hammond, Ind.

1—Whenever the wheels of an automobile cease to have a perfect rolling action along the road and have a sliding action or an action in which slippage results, skidding is likely to occur. The most common example of skidding is encountered when the brakes are applied, but skidding will not occur unless the brakes are applied sufficiently to cause the wheels to slip. Of course, when the pavement is very slippery, as after a sleet storm, it requires merely a touch of the brake pedal to lock one or both wheels, and as soon as the rear wheels start to slide along the pavement instead of rolling there will be nothing to cause the car to go in a straight line.

A common illustration of skidding is to be seen in winter where the children slide on a strip of ice, taking a run and then sliding. In doing so they will invariably spin around more or less at the same time they are sliding in a certain direction.

In the case of motor cars the amount and distribution of the weight of the car with reference to the four wheels also has a material effect in producing skidding, a very heavy car usually having a greater tendency to skid than a light car.

While skidding is most commonly encountered when applying the brakes, it is also possible to skid by accelerating too rapidly, causing the wheels to spin. Such skidding, however, is very rarely serious and the extent of it is not great unless the car happens to be on a crowned road, so that there is a tendency for the rear of the car to slide sideways into the ditch. In similar manner, skidding is possible at the front wheels if driving along a slippery crowned road. This is due to the fact that the weight of the car is too great for the friction between the front tires and the road and causes the front of the car to slide toward the ditch.

The principle of non-skid tires or

The Readers' Clearing House

THIS department is conducted to assist dealers and maintenance station executives in the solution of their problems.

Readers' names will not be published with articles, if a request to this effect is received with the letter. The name and address should be given, however, so that we can send a copy of our answer direct by letter. This saves waiting for the answer to be published, which sometimes occurs several weeks later, depending upon the space available.

Also state whether a permanent file of *MOTOR AGE* is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous issues.

Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.

Addresses of business firms will not be published in this department but will be supplied by letter.

Technical questions answered by B. M. Ikert, P. L. Dumas and A. H. Packer; Legal, by Wellington Gustin; Paint, by C. King Franklin; Architectural, by Tom Wilder; Tires, by a Practical Tire Man; General Business questions, by *MOTOR AGE* organization in conference.

safety chains is similar to the principle which leads athletes to use shoes that have spikes on them, as they get a better grip on the ground. In the same way the rubber projections of non-skid tires have greater frictional action than a smooth surface, while the safety chains tend to dig into the ground and keep the wheel from sliding sideways.

The best remedy for skidding is to prevent skidding, and nothing but careful driving will do this. The use of non-skid tires and the application of safety chains during rainy or snowy weather is highly desirable. Then when approaching crossing or other places where it may be necessary to slow down, it is well to have the car under control and apply the brakes very gradually some time before the crossing is reached, thus preventing the necessity for a sudden stop and the likelihood of a skid occurring.

The Reverse Bushing Cuts Out

Q—We have a 1917 model Ford car which we have repaired. We had new bearings run in the engine block and new crankshaft put in by the Ford agency in Louisville, Ky. While we had the parts down we noticed the transmission needed rebushing. We rebushed the slow speed and reverse gears. The old bushing in the reverse gear had cut or worn out completely on the front, and only a 1/2-in. portion of the bushing was left at the rear of the gear.

The owner of this car states that this transmission has never been disassembled before and that he has always noticed and cleaned out a considerable accumulation of fine brass particles whenever the lower cover was off. A close examination failed to show any reason for the bushing in the reverse gear cutting out in this way.

Since being reassembled the transmission makes a loud humming noise when we run the car in any speed, although in high speed the noise is most noticeable. We have tried all adjustments on bands and clutch fingers, from extremely tight to extremely loose, without affecting the noise. The fine brass particles are still being deposited about the inside of the engine.

Advise what may be the cause of the reverse bushing cutting out and what is the cause of the excessive noise. Would it be well to cut away some of the bushing to stop the noise and is it possible that the trouble is in some other part of the transmission. We have put in new spiral timing gears and have made sure the magneto is not dragging on the coils.—M. F. Thrasher, Lewisport, Ky.

We have the following suggestions to make: One possibility is that the transmission shaft is slightly bent. Another possibility is that the portion of the slow-speed drum and gear on which the reverse drum bushing rotates is slightly rough and causes the trouble you mention. It is also possible that the rear transmission support bearing is worn out and needs replacing. This is accessible by removing the rear axle and is the member which forms the front half of the universal joint housing. It holds up the rear end of the transmission and excessive wear at this point might allow the transmission shaft to spring and cause the trouble you have experienced.

Another possibility is that too many clutch discs are being used and the wear is occurring where the clutch throwout yoke bears against the clutch throwout collar. Still another possibility is that the noise is really in the rear axle and you may be able to determine this by running the engine and jacking up one rear wheel, trying it that way and then trying it with the other rear wheel jacked up.

Separate Shop Undesirable

Q—We wish you to draw us a plan for an up-to-date garage building on a lot 50 x 80 ft. We want a showroom for one car, accessory store and stockroom for parts. This is to be a one-story building.

The main street is on the east and will have a plate glass front with the main entrance. The north is a solid brick wall already built. The south will be next to a vacant lot and we will have to get most of our light from this side and the west end. How many double windows should there be? The west end is an alley with an entrance from this end when needed. We will want a wash pit and toilet in the building somewhere in the rear.—Powell-Maddox Motor Car Co., Brownsville, Tenn.

Your space is hardly extensive enough to permit a shop being partitioned off; you would get better results from leaving it open, using the light side for shop space and the opposite side for storage. The aisle is rather narrow but by the judicious parking of short cars opposite long ones fairly good results could be obtained.

Unless you control the vacant lot to the south there is a probability that your light will some day be cut off, but if that happens there is no reason why you cannot get plenty of light from above. It might be well to consider this possibility and build a solid wall depending from the outset upon skylights.

The washrack should be in the northwest corner where the space can be used for storage when there is no washing to be done.

Architectural Service

IN giving architectural advice, MOTOR AGE aims to assist its readers in their problems of planning, building and equipping, maintenance stations, garages, dealers' establishments, shops, filling stations, and, in fact, any building necessary to automotive activity.

When making request for assistance, please see that we have all the data necessary to an intelligent handling of the job. Among other things,

we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

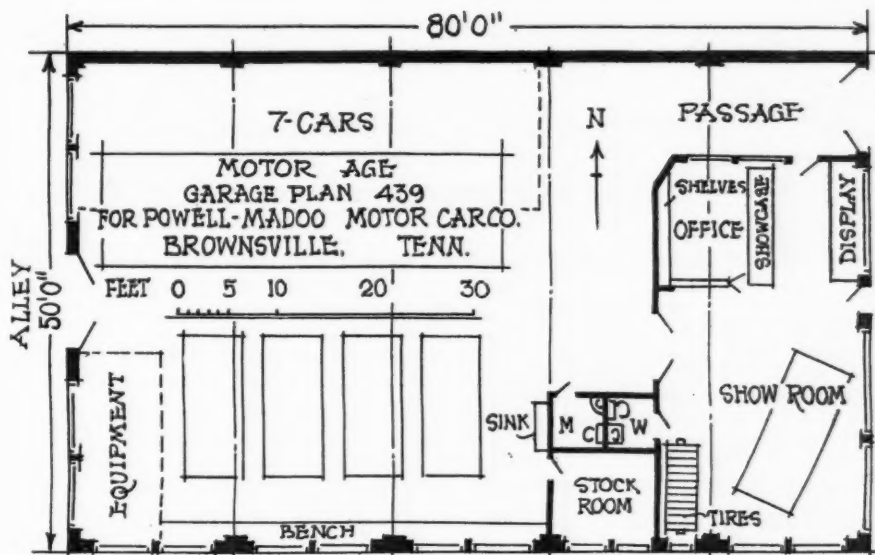
What departments are to be operated and how large it is expected they will be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

How much of an accessory department is anticipated.



GENERATOR CHARGING RATE FALLS OFF

Q—We have been having trouble with generators of different makes. After being fixed up they seem to charge all right but after the car is driven 50 to 100 miles they charge less and less till the charging rate comes down to a certain point. When the position of the brushes is changed, the charge is increased again for another 50 miles or so. In some of these generators where there is no adjustment for the current output, the sanding of the commutator helps for about the same distance. The amount of charge after being driven is then only about 2/3 of the manufacturers recommended rate.

1—It occurs to us that possibly you are using replacement brushes which are not exactly suitable for the machine you are working on. When first installed such brushes make contacts at one or two places and give a heavy charging current. As the brush wears down it makes a more perfect contact with the commutator and while this would seem to give a better output, it also has the effect of more thoroughly short circuiting a portion of the armature which may on the other hand give a lower charging current.

Under these circumstances the quality of the brush has a great deal to do with this operation. For example, if a brush of solid copper should be used it might in some cases give a very low output in spite of its good contactivity, as it puts a short circuit on the coils being commutated, that is, coils which are passing from under a north pole into the region of a south pole or the reverse.

Another possibility is that too much oil is being used in the bearings and this gets onto the commutator and works into the surface of the brush, so that in a short time the current drops off abnormally. Still another possibility is that your preliminary test is made on a cold generator while the test later on is made when the generator is hot, having been brought in by the car owner at the end of a long run. As the output of the generator when hot is always lower than the output when cold, this might account for some of your trouble.

The fact that sanding of the commutator improves conditions temporarily, might point to the oil theory above mentioned as a likely cause of the trouble. Increase in current by changing the brushes we believe, is due merely to the fact that they no longer seat on the commutator and make contact at one or two points only, which gives increased charging current until the brushes again wear to 100 per cent contact. This complaint is so rare that we would like to have specific generators mentioned in case the above suggestions do not enable you to overcome the condition.

2—Why will sticking brushes in a generator cause the battery to discharge?—Emil F. Karel, Ravenna, Nebr.

2—Sticking brushes cannot cause a battery to discharge except indirectly. That is, the starting motor lights, horn and ignition all use current from the battery and if the generator does not replace it the battery will, of course, become discharged, depending on how

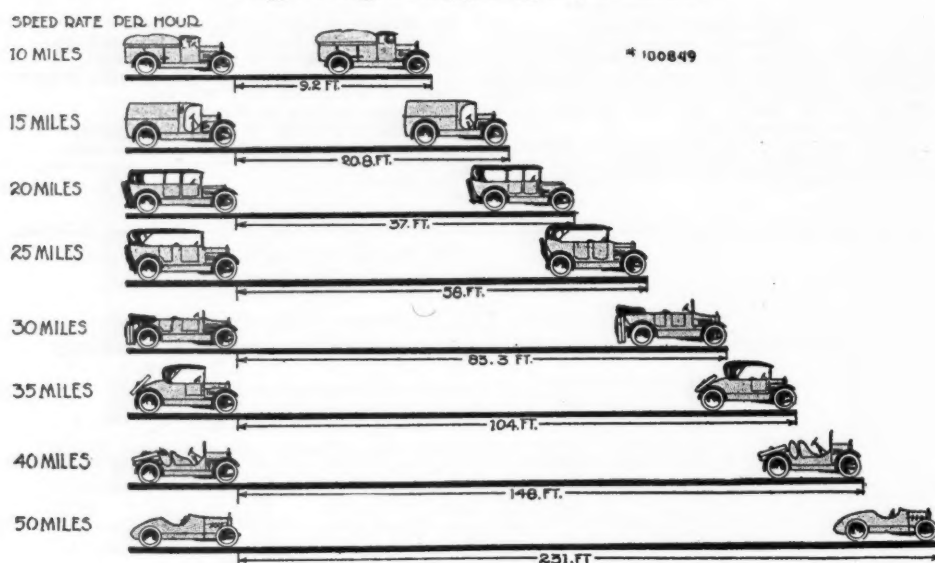
much the current is used. If on the other hand the brushes in the generator were sticking and we never use any current for the starter, lights, ignition and horn, the battery would not become discharged, except to the extent that it would run down about 1 per cent a day due to internal action. If you have any specific case in mind would also appreciate having details in regard to it.

CYLINDER ANGLE OF LINCOLN ENGINE

Q—Settle a dispute about the Lincoln engine. A friend claims that the cylinder blocks on this engine are set at 90 degrees and that all 8 cylinder engines must be set that way. I claim that the Lincoln cylinder blocks are set at an angle of 60 degrees or 45 degrees. Advise as to who is right.—Jules L. Sottiaux, Lovington, Ill.

The cylinder blocks would have to be set at 90 degrees to have the same angle of rotation of the flywheel between each explosion stroke. On the Lincoln engine however the cylinder blocks are set at an angle of 60 degrees, so that first the flywheel turns 60 degrees between firing strokes and the next interval is 120 degrees, then 60, then 120 and so on. This construction has the advantage of making an engine more compact and reducing the overall width of the hood so that a more pleasing design results. It is also claimed that this construction diminishes somewhat the vibration of the engine.

Figuring Stopping Distances



Correct stopping distances with good brakes

Q—Advise the distance required to bring a truck to a stop at various speeds, provided the brakes are in good working order, and the roadway dry. Also, what effect, if any, the weight of the truck and the load it may be carrying has on this theoretical stopping distance.—Godlove Motor Corp., Memphis, Tenn.

1—Assuming that the brakes are in good condition and the road bed dry, the distance required to bring a motor vehicle to a stop is shown in illustration. The chart is graduated for the different speeds of the vehicle in miles per hour, and is applicable to trucks as well as passenger cars.

The weight of the vehicle is not considered in compiling these distances, although the weight of the vehicle and its load determine the amount of foot pounds energy that must be dissipated in bringing the vehicle to a stop.

The work put into a vehicle having "x" weight, "x" velocity is computed by the formula for acceleration of bodies as follows: Kinetic energy equals $W \times V^2$ divided by $2G$.

Where V =Velocity in feet per second

Where $2g$ =The acceleration due to gravity or $2 \times 32.2 \text{ ft.} = 64.4$

If the expression is reduced to miles per hour, from feet per second,

1 mile (5280 ft.) per hour (3600 seconds) equals 1.466 ft. per second, so that WV^2 divided by $2G$ equals $Wx \times 2.15$ divided by 64.4 equals $Wx \times .0334$

Then a vehicle weighing 2240 pounds traveling at 30 m.p.h. will have a kinetic energy of $2240 \times 900 \times 0.0334$ equals 70,674 foot pounds.

The distance required to bring the car to a stop is calculated by the same formula with the addition of certain friction and load coefficient. Taking "R" as the coefficient of friction between the tires and the road surface which is approximately 0.60, and "S" as the ratio of the total weight to the weight being carried by the wheels to which the brakes are applied, we have the following:

Distance "D" equals 70,674 divided by $.6 \times 1,344 = 87.6 \text{ ft.}$

It will be seen that this distance approximates the distance shown on the chart.

TO STOP OIL LEAKAGE

Q—Advise how to stop oil from leaking out of the rear main bearing on a model 12 Stewart 2 ton truck. We have put in a larger drain pipe and made bearing as tight as possible, but without results. The oil pump is attached to rear bearing and has a little adjusting screw. What effect has this screw on the oil pressure, as we have adjusted it both ways without results. Motor is getting too much oil and smokes very badly.

1—According to information we have available the model 12 is not a 2 ton truck. The remedy for the oil trouble, however, is to remove the pipe entirely and drill out the hole $5/16$ in diameter. Then one inch at either side of this hole drill other $5/16$ holes so that you will have three drain holes for the oil.

We are advised that there is no adjustment to the oil pump, it is a gear driven pump and the screw that you may have turned is possibly one holding the cover on the pump. The addition of the two extra drain holes and enlarging the present one by removing the pipe should overcome the oil trouble.

2—What time do you consider fair for the following operations: Remove generator, clean and make necessary repairs, install new ball bearings, fit new brushes, test generator and replace on car? Give this information for the following machines: Number 1—a Ford generator, Number 2—Delco generator used on D45 McLaughlin, Number 3—Northeast third brush generator on recent model Dodge car.—A Reader.

2—We understand that Ford genera-

tors are being overhauled in Chicago at authorized service stations for \$3.50, there being no definite time assigned to the job, however. This includes taking the machine off, repairing and replacing necessary parts, turning and undercutting the commutator and putting the machine back on the car again. The parts, of course, are extra.

On the Delco motor generator used on D 45 McLaughlin which, by the way, is the same on the D 45 Buick, the following charges are made, there being no definite time assigned. Taking off and replacing, \$2.00. Repairing, \$3.00. Repairing includes replacing or repairing generator clutch but does not include any work on the armature. Turning armature and undercutting is \$1.25. Retiming when installing on engine again is 50 cents. Repairing the distributor which is mounted in the generator is \$1.50. If necessary to replace the motor clutch the charge for this is \$2.50. Parts, of course, are extra.

In the repair of the Northeast third brush generator used on Dodge cars an hourly allowance is made as follows: Taking off and replacing, 1 hour. Overhauling, $2\frac{1}{2}$ hours. Replacing field coil, $\frac{1}{4}$ hour. Replacing commutator end bracket and changing all parts from the old bracket to the new $\frac{1}{4}$. The rate is \$1.50 an hour.

SHOOTING IGNITION TROUBLE

Q—We have a customer who has a new Buick six which he has driven two months. When the motor is idling and you switch off the ignition, the engine will stop, but if you speed up the engine to the equivalent of about 20 m.p.h. and then turn off the ignition switch, the engine will keep on running just the same as if the switch were on. When it does this, which is all the time, the ammeter will not show more than two amperes charge, but turn the switch back on and it will show charge as it should. It does not seem to run down the battery when the motor is stopped, please tell us where the trouble lies.—Graham Garage, Jamestown, Mo.

1—The generator on this car does not use a cutout and the operation of the ignition switch connects the battery to both the ignition and the generator, so that no cutout is required. We accordingly believe that the trouble is in the switch and that when the ignition switch is turned to the off position, it disconnects the battery but leaves the ignition connected to the generator. It also means that, when the engine is turning very slowly and you shut off the ignition, there is not enough generated voltage to keep the ignition going. However, when you shut off the ignition at high speeds the generator has enough voltage to supply ignition current and this accounts for the action. If it were possible for you to see the interrupter points at the same time, you would see an abnormal condition of flashing, due to the generator voltage being abnormally high, on account of being disconnected from the battery.

Rebuilding a Packard After a Fire

Every now and then the dealer's shop gets a job of fixing up a car which has been in a fire. Many points come up in such a job not encountered in the ordinary course of maintenance work. Consequently the answer to the inquiry on these pages regarding the rebuilding of a car damaged by fire may be of use to other men who have a similar job to handle.

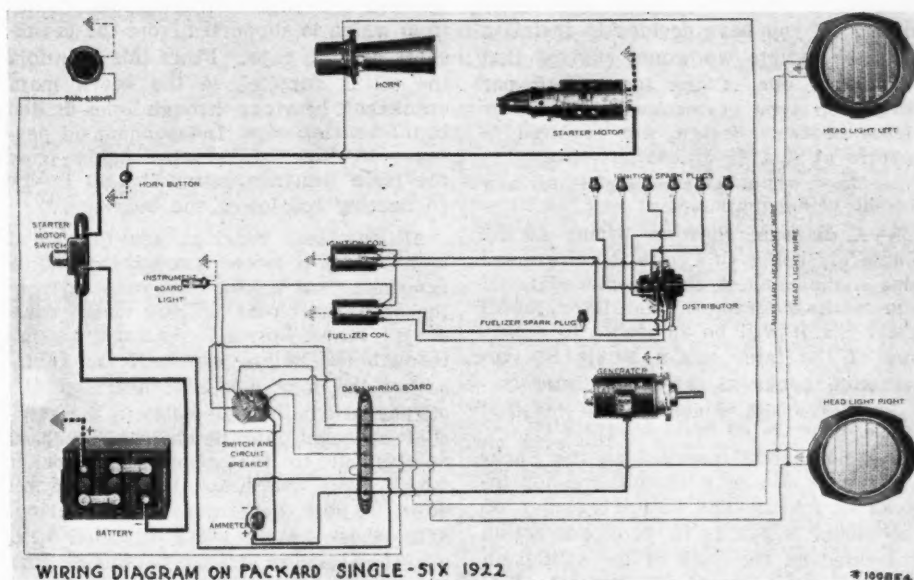
Q—We have a Packard S-6, 116 in. wheelbase which has had the wheels and body burned off after about 500 miles of service. The engine and radiator are in good condition as the front end did not seem to get so hot. About three pints of oil were in gearset after the fire. The rear axle got pretty hot but can turn shaft in housing from rear universal joint. The frame has apparently sagged about 1 inch between rear motor supports and kickup. Kickup from starting point back to rear shackle hanger has bent upward about 4 inches. Can this be straightened so as to be satisfactory? If so, what method should be used, or should new frame be fitted?—Miller's Garage, Wichita Falls, Texas.

It is possible to straighten almost any automobile frame but we believe that the amount of labor that will be required to do a satisfactory job on this particular frame would cost more than to secure new side rails or side members. The price of the proper side rails is \$27.50 each.

2—What parts of this car are tempered so as to be rendered unserviceable by the heat?

2—To make out a complete list of the parts that would be rendered unserviceable by the heat would require considerable space in addition to which the amount of heat required to render some of these parts would vary considerably so that it would be impossible for us to attempt a list that could be of any value as a guide.

Such parts as ball and roller bearings can be tested to see whether they have been injured by the heat with a file and this test of course should be made in



The single wire system used on the late model Packard Single Six

addition to a visual test. Unless the bearings show a dark blue color you can expect that they have not been sufficiently heated to cause them to lose their heat treatment. The same holds true of the other parts of the chassis and we would suggest that if any of the bearings, cones or shafts which are journaled in these bearings show by their color that they have been exposed to heat it would be wise to check them with a fine file.

You no doubt realize that the ball races and the balls themselves should be glass hard, so hard in fact that it will be impossible for the edge of the well sharpened file to touch the surface. This of course is a very rough test and if there is a Packard agency in your vicinity we would advise that the parts under suspicion be taken to that establishment to be examined.

Judging from your letter we are inclined to believe that the bearings and shafts have not been subjected to enough

heat to injure them due to the fact that you state there were three pints of oil in the gearset after the fire. Heat sufficient to anneal bearings would also consume all of the oil in the gearset. However, as before stated we would suggest that you judge the parts by color and the use of a file.

3—The distributor is badly burned but housing is good. Explain action of this distributor, which uses two coils.

3—The distributor unit consists of a single camshaft with two breaker arm mechanism, each being electrically separated from the other. One of these breaker assemblies controls the ignition circuit and the other the fuelizer circuit. It is for this reason that the fuelizer interrupter has its own coil. These coils are interchangeable and the failure of one coil will not interrupt the operation of the engine because the good coil can be placed in position on the ignition side. There is no real good reason why you should desire to change the style of coil, however, if there is some personal reason for this change, any Packard Delco coil will work satisfactorily on this system, if it is of the 6 volt type drawing about 5 amperes at 6 volts.

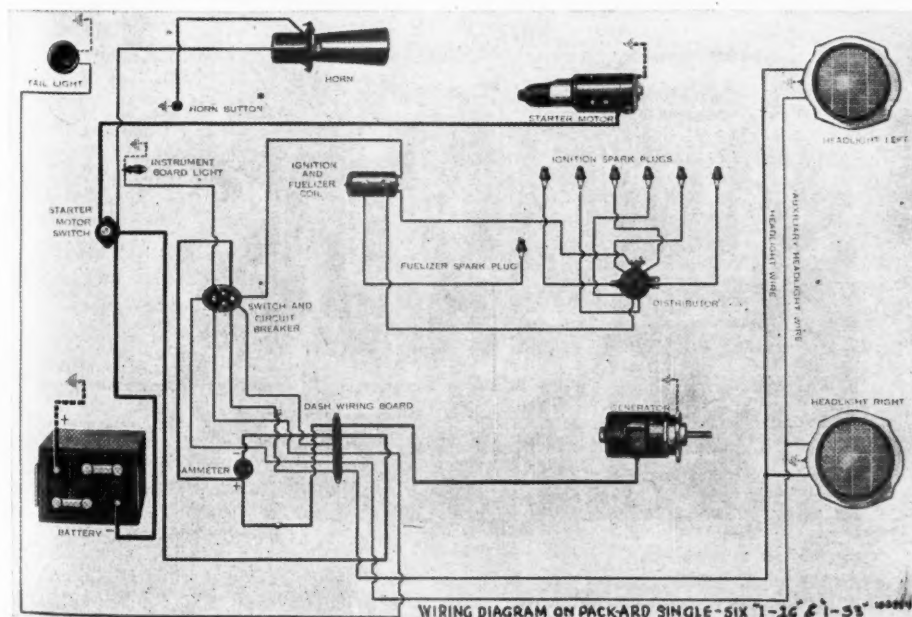
4—Does the fuelizer shoot every time a plug fires?

4—The fuelizer is connected to its own interrupter and coil and if properly synchronized fires at the same time as does the spark plug in that particular cylinder.

5—What magneto could be fitted and cut out fuelizer?

5—To install a magneto on this engine would require considerable machine work and it is doubtful whether a magneto would give any better results than the present ignition system. As to eliminating the fuelizer we believe that this would be a grave mistake as without a doubt this is one of the most valuable features of this engine.

If you are set on installing a magneto we would state that the conventional two spark magneto has reached approximately the limit of rotation when it is installed on a six cylinder engine rotating at



The earlier models of the Packard Single Six were wired as shown above

3000 r.p.m. which this engine will easily attain. If you have decided to install a magneto system we would suggest that you select one of the four spark per revolution type of magnetos which, by virtue of their design, are required to revolve at just $\frac{1}{4}$ crankshaft speed.

6—Show wiring of this model and new models using one coil.

6—A diagram showing wiring of the single six using two coils is shown and also a diagram of the later model. If you wish diagram of the later model Twin Six it will be advisable to secure one of the later model single Six instruction books at the same time.

7—Starter and generator are in good shape, why are no fuses used?

7—The system installed on the Packard makes use of a circuit breaker instead of fuses. The circuit breaker on the model which is in your possession is located on the back of the switch on the instrument board. The normal lighting current does not affect the circuit breaker but if a short circuit should occur, causing a heavy current to flow, it would operate the circuit breaker causing it to open the circuit. This makes a clicking noise which will continue until the short circuit has been eliminated. Fundamentally this circuit breaker operates the same as the circuit breaker system on the Buick Delco models.

8—Should the carbureter be sent to the factory for overhauling?

8—It is not necessary to send the carbureter to the Packard factory for overhauling as the authorized Packard Service Stations in the larger towns are equipped to do this work.

9—Could we put in 10 or 17 in. in the frame while straightening and be able to fit a new type of body?

9—It is possible to splice the frame and add 10 or 17 inches, but as before stated we would advise that you secure new side rails of the long type.

10—Where can we get plates suitable for this and where should the frame be cut?

10—Plates that will fit the channel section of the Packard frame proper, probably will have to be made up special. Although if there is a steel supply jobber in your vicinity you might consult him and find out whether he carries any channel section stock that will fit the frame. The frame should be cut some place midway between front and rear, probably not more than 2 ft. behind rear engine support.

11—Did Packard make any changes in the shape of the radiator when they improved the S-Six so that the new hood would not fit the radiator we have?

11—We have been informed by the local Packard agency that this will necessitate a new radiator if you wish to use the new style hood.

12—Show course of oil in this engine and what pressure the gage should show at certain revolutions per minute of engine.

12—A cut of the oiling system of this engine is shown. The operation is as follows: The oil is drawn from the crankcase reservoir through the strainer located at the pump housing and is

pumped to the main oil distributing manifold which is supported from the crankshaft bearing caps. From this manifold the oil is supplied to the seven main crankshaft bearings through holes drilled in the bearing caps. Independent oil passages in the crankshaft, leading from the main bearings, carry the oil to the connecting rod lower end bearings.

All camshaft bearings are lubricated by oil which is forced through the hollow camshaft from the oil lead running from the crankshaft rear bearing to the camshaft rear bearing. After passing through the hollow camshaft and lubricating the four camshaft bearings, the oil passes out through holes in the camshaft sprocket onto the chain. The chain carries oil to the generator shaft bearing. After these bearings are supplied with oil, the surplus drains back into the crankcase oil reservoir.

The cylinders and piston pin bearings are lubricated by oil spray thrown from the lower end connecting rod bearings. Holes drilled in the crankcase allow the oil mist to rise into the valve compartments and lubricate the valve mechanism. Baffle partitions located crosswise in the bottom of the crankcase prevent the oil from surging.

The oil supply is obtained by pouring oil directly into the crankcase through the filler on the left side of engine. The crankcase should be kept filled to the petcock level. About $2\frac{1}{2}$ gal. are required to fill the crankcase to the petcock level. Do not carry an excess of more than $\frac{1}{2}$ gal. of oil above this point, as the connecting rods would be apt to dip, especially in hilly or rolling country. When touring, 1 gal. of oil may be added above the normal, or petcock level to make necessary less frequent stops for re-

plenishment, as this will not be required until the level in the crankcase falls below the petcock.

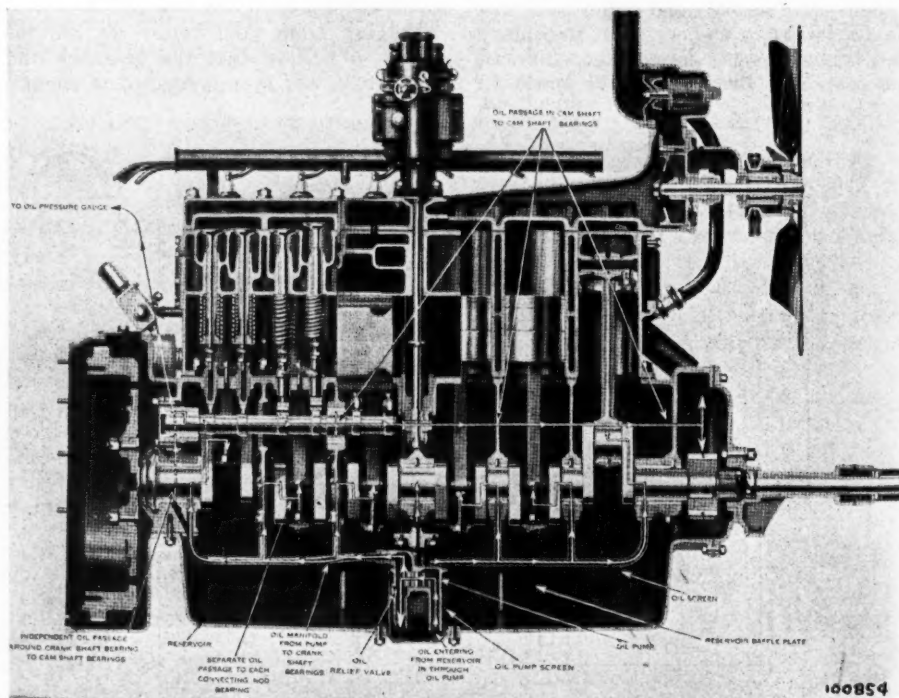
Do not put oil into the front end compartment through the plug opening at the right of the front end of the crankcase. This opening is intended only as a means of inspecting the front end chain.

The gage on the instrument board should show from 20 to 35 lbs. oil pressure with the engine warm and running at 900 r.p.m. and not less than 2 lbs. pressure at 300 r.p.m., corresponding to a speed of about twenty-two and seven miles per hour respectively, with the standard rear axle gear ratio and the engine warm.

A gear pump located at the lowest point of the crankcase forces oil from the reservoir to the main oil distributing manifold, which is attached to the crankshaft bearing caps. The pump is operated by a shaft driven by a spiral gear on the camshaft. It may be removed for cleaning or inspection by taking off the lower half of the crankcase and unscrewing the nuts which hold it to the bottom of the upper half and disconnecting the oil manifold. No adjustment of pump gears is required. The oil pressure is regulated by means of the oil pump relief valve which is accessible through a cover plate in the bottom of the crankcase lower half.

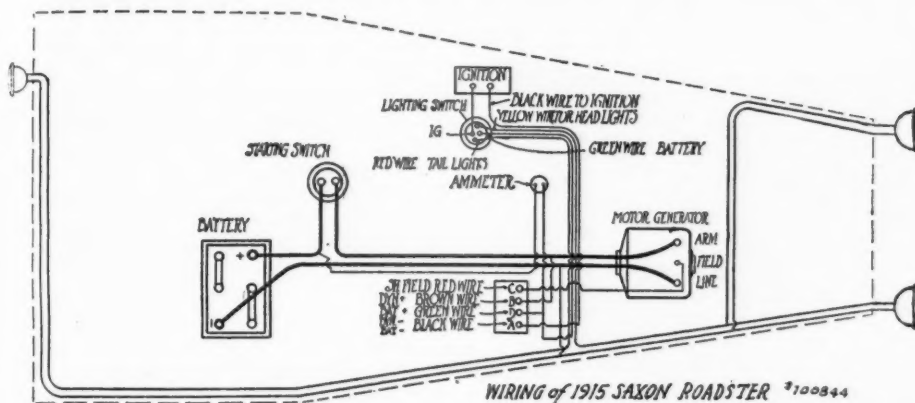
The oil relief valve is contained in the pump body. It is controlled by the tension of a coiled spring which should be set to the proper pressure. The inlet to the relief valve is connected with the pump discharge passage and any excess pressure causes the valve to open and allows the oil to return to the inlet of the pump.

To raise the oil pressure, drain all oil
(Continued on next page)



Sectional view of the Packard Single Six engine showing oiling system

Wiring Diagram of 1916 Saxon



Q—We have a Saxon four cylinder roadster, 1916 model, equipped with electric lights and starter, Atwater-Kent ignition. The starter and generator are combined, being Detroit make and using a Ward-Leonard controller. We cannot get this

wired up right for some reason or other, so would like to have a wiring diagram.—T. A. Gustafson, Fort Dodge, Iowa.

The wiring diagram shown herewith should enable you to take care of the job on your car.

MAGNETS RECHARGED AND CAR STILL GIVES TROUBLE

Q—What can be done with a 1914 model Ford which misses and runs very poorly when the car lights are turned on? It has been overhauled and all new parts installed where the wear was appreciable. The magnets were all recharged, taking care that they were put in properly, and the distance between magnets and field coil was checked to the thickness of a putty knife blade, or less than 1/16 in. What can we do to make this job right?

1—Since the Ford is a 1914 model, it is possible that it had magnets of the smaller type, which were not very suitable for operating the lights. It is also possible that, although you used considerable care, one of the magnets may have been turned the wrong way.

There is also a chance that, even if the magnets were properly magnetized, they were knocked around or in some way lost much of their magnetism before the engine was finally assembled. We would accordingly suggest your recharging the magnets in the engine, as this is a job that takes only 15 or 20 minutes and may cure the trouble. We are sending you an instruction sheet which gives method recommended for doing this work.

Another possibility is that the magnets are O. K. but that there is a short or ground in one of the magneto coils.

Using the recharging process will probably burn out such a short if one exists and, if you have a direct current ammeter available such as is used on a Ford car, you can check the current which the magneto takes from the battery, using in this case, however, one 6-volt battery instead of the 24-volt battery recommended for the recharging process. The current should be about twice the voltage, that is 12 amperes on 6 volts, and if it is much in excess of this it shows that there is a ground somewhere in the coil winding and it may be necessary to tear the engine down in order to find it. For example, if on 6 volts the ammeter would show 24 amperes or if on 4 volts it would show 16 amperes it would indicate a ground at the bottom coil of the magneto.

If both the magnets and the coils are in good shape and you still have trouble, it is probably due to too much end play in the crankshaft, which allows the gap which you checked with the blade of the putty knife to increase much in excess of 1/32 in. This means that the rear main bearing cap is badly worn and a new one should be used, as this cap is depended upon to take the thrust and keep the crankshaft from working back and forth. A condition of end play is indicated if it is much easier to crank

up and start the engine with the clutch in and one rear wheel jacked up than it is under ordinary circumstances.

2—We have another Ford car, 1918 model, which smokes very badly and always has. The pistons and rings seem to be in good condition and the engine pulls well. It has good compression but the plugs fouled up very badly until we started to use tractor plugs. It then operated O. K. but smoked very badly and used much more oil than it should. We put in Ever-Tite rings on the bottom groove, also drilled 3/8-in. holes just below the lower rings, five to a piston, but this also did no good. We then drilled a 3/8-in. hole in the oil pipe as far back as we could and this stopped the condition of smoking and apparently gave normal operation. Did we do the right thing or not? Is there any other thing we should have done?—J. F. Buckles, Albion, Ill.

2—While the piston and piston rings appear to be in good condition, it is possible that the rings have insufficient tension and do not press hard enough against the cylinder walls. Such a condition might be due either to usage or to a defect in the material whereby it would have insufficient spring or elasticity. With the cylinder head removed and inside micrometers available you can check the cylinders for circularity and there should not be more than .003 in. variation in dimensions taken different ways.

If you have a file of the back numbers of MOTOR AGE, would suggest your reading the articles on fitting pistons and cylinders in the May 18 and May 25 issues of MOTOR AGE. In fitting new rings it is desirable to get them the right size for the cylinders rather than getting them considerably oversize and filing off the ends to make them go in, as this gives a ring which does not fit, being slightly egg shaped instead of circular.

In drilling a 1/8-in. hole in the oil pipe we assume you did this in such a position that part of the oil going down the pipe leaks out at approximately the number 4 cylinder, so that a reduced portion goes to the front of the engine. We feel that you are taking a considerable chance in doing this and may have trouble due to burnt out main bearings or connecting rod bearings. This method of oiling has proven substantially satisfactory on so many Ford cars that trouble in your case shows no fault in the oiling system, but obviously a fault in the pistons and rings or in the way they fit the cylinder walls.

(Continued from preceding page)

out of the engine and remove oil pump cover plate on bottom of crankcase; remove the cotter pin from the adjusting stud and increase the spring tension by turning the adjusting screw clockwise with a screw driver.

To lower the pressure, the spring tension should be decreased. Be sure the cotter pin is replaced before the cover is put on the crankcase.

13—What make of clutch and show method of disassembling and adjustment.

13—The clutch is of Packard design and manufacture. The only adjustment provided is for the clutch pedal. When

the clutch is in the fully engaged position, the pedal should depress 1 in. under light spring pressure before resistance of the heavy clutch springs is encountered.

If the pedal is brought against the floor board before the clutch is entirely engaged, full action of the clutch springs is not obtained which will cause the clutch to slip. The rod connecting the clutch pedal with the clutch release lever on the left of the clutch housing gives the necessary means for obtaining the correct adjustment for the clutch pedal. Lengthening the rod, by means

of the adjustment nut, will increase the amount of travel under light pressure before disengaging. No other change from the original adjustment will be required as clutch surfaces are automatic in their compensation for wear.

14—Show method of overhauling rear axle. There is about a quart of oil in axle housing but all the felt washers are burned and cannot tell where they were.

14—It is impossible for us to give you explicit directions for overhauling the rear axle and we would advise that you seek the advice of an authorized Packard service station and also consult the Packard instruction book.

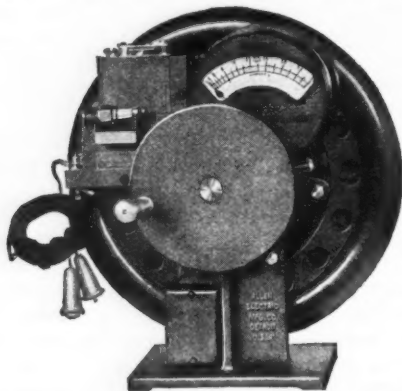
GETTING MORE OUT of the SHOP

"MY idea of real service," says a bank president, is to drive into a garage and see an orderly, clean place and have a neat appearing attendant come to me and ask, politely, what I want and then be able to give it to me."

That is summing it up in a few words, you'll agree, and the winter let-up will enable you to clean the shop and instruct your employees. Also you'll have an opportunity to think about any new equipment you may need.

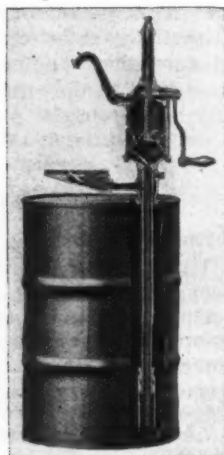
Several new items of equipment are announced on this page which will probably serve as a guide to your equipment needs.

The Allen Tester uses genuine Ford magnetos and magnets and the coil is placed where it is easy to get at. It will test the magneto in the car and has a separate connection for horn and spark plugs. An alternating current ammeter registers the current output. The price

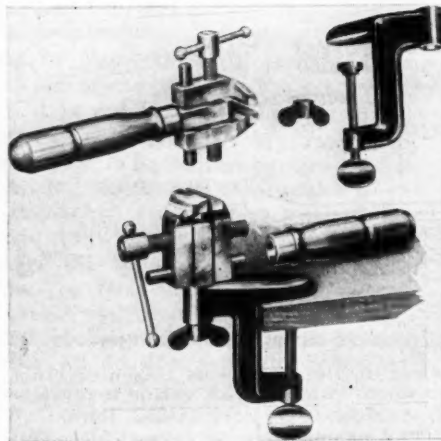


without magnetos and magnets is \$53. Allen Electric Mfg. Co., 2987 Franklin Street, Detroit, Mich. Price, \$65.

Marvel Oil Pumps, at one complete action of the piston, measure either a quart or pint of oil, depending upon the size of pump used. The pump is screwed into the bung of the barrel, the intake



pipe finding its own level, automatically. Working parts are iron and steel, the cylinder is heavy brass tubing, the rack and pinion are of chrome vanadium steel. The Marvel Equipment Co., Cleveland, O.
The L. S. Starrett Co., Athol, Mass.,

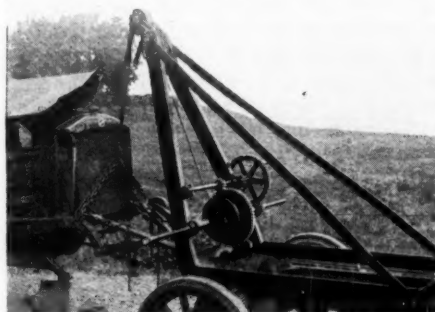


announces the Starrett Combination Hand Vise, No. 86. The use of a ball end handle for tightening the jaws, instead of a wing nut, is one of the features.

The hand vise is furnished with a clamp permitting its use as a small bench vise on benches or shelves having an approximate thickness of $\frac{1}{2}$ in. to $2\frac{1}{2}$ in. As shown in the illustration, the change is effected by removing the handle and substituting the clamp. When used with the clamp, the vise can be adjusted to any point in a complete circle to meet the convenience of the user.

The jaws of this vise are tempered and polished drop forgings, $1\frac{1}{2}$ in. in width. The capacity of the vise is about $1\frac{1}{2}$ in.

The Holmes Wrecker, the product of the Ernest Holmes Co., Chattanooga, Tenn., sells for \$110. The cut gives a close up view of it attached to a wrecked car. It is controlled and operated from



the ground, making it unnecessary for the operator to climb in and out of the service vehicle.

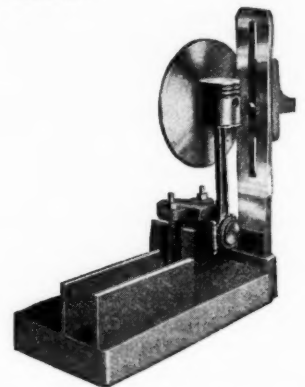
There has been put on the market recently a cleaning compound which seems to possess many qualities that make it suited to the various needs of the maintenance establishment. The product is called Sanitary Soda Crystals and is used in a water solution for cleaning chassis parts of grease and oil and in addition is said to be very well suited for the highly finished surface of an automobile body. It is claimed the compound contains no caustic, acid or filler. Nor will it burn the hands or clothing.

For removing rust and scale from radiators and water jackets, a table

spoonful of the compound is placed in the water system and after a short time the water drained off. The compound is put up in 1 lb. and 5 lb. packages which sell respectively for 25 cts. and \$1. It is made by the Catalysis Co., 3000 Michigan avenue, Chicago.

A Universal Wilkie Special Aligner for Ford piston and connecting rods is announced by the Wilkie Machine Works, Winona, Minn., and takes care of misalignment of connecting rods and pistons in Ford, Fordson and Lincoln motors. Three sizes of arbors on one 12 in. mandrel are furnished. The size of the connecting rod bearings of Lincoln and Fordson motors is two inches. One of the sizes on the mandrel is .002 in. under 2 in. to accommodate worn motors.

The arbors of the Wilkie aligner bolt into the double V block, which is cast integrally with the heavy base. The complete two-in-one outfit sells for \$38.50, at the factory. The cut shows the tool as a piston aligner.



Wayne Valve Seat Reamer with Expanding Pilot lists at \$3.90 each with extra cutters at \$1.85 each. It is made with $\frac{5}{16}$, $\frac{3}{8}$, $\frac{7}{16}$ dia. pilots and the cutters furnished in either 45 or 60 deg. angle. The expanding pilot of the reamer was designed to insure a perfect

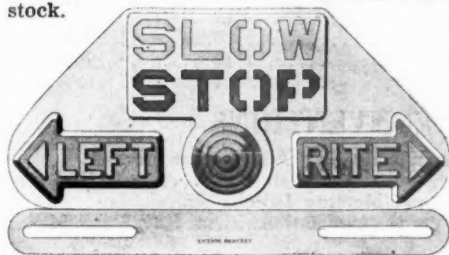


sliding fit of the pilot where the valve stem hole has become larger by wear. After inserting the pilot in the hole, it is expanded by screwing down the taper mandrel until a sliding fit is obtained. It is made by the Wayne Tool Mfg. Co., Waynesboro, Pa.

BOOSTING ACCESSORY SALES

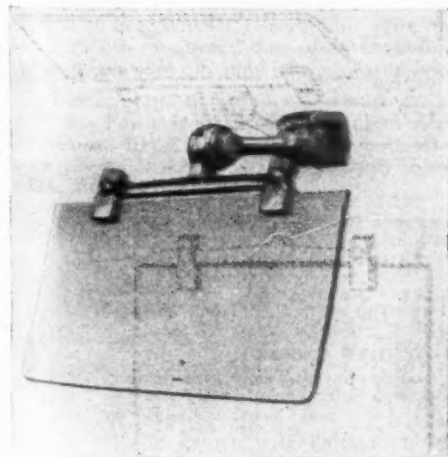
THIS is the season for car heaters, anti-freeze solutions and the like, but because it is cold does not mean that you cannot go right on selling everything that you ordinarily sell. As a matter of fact, this is the best time of the year to sell, because you really have an opportunity to, or rather you must work if you would "put your stuff across."

When motoring is at its height, things move whether you put any effort behind them or not, but in the so-called dull season a man's sales ability shows itself. Another thing to note at this time of the year in boosting accessory sales is the manner in which you buy things. You cannot be too careful in selecting your stock.

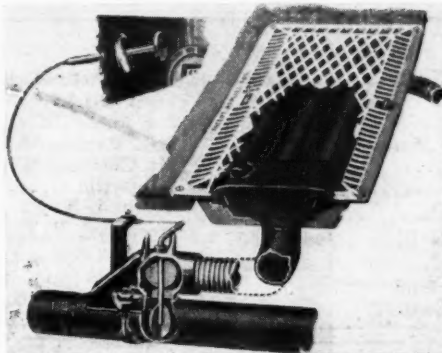


The Diamond Safety Signal, the product of the Automotive Distributing Corp., 703 Finance Bldg., Philadelphia, as illustrated shows a right and left turn, slow and stop. The price is \$12.50 and combines a license bracket with the safety signals and tail light. It is made of pressed steel.

The Woodworth Adjustable Lace-On Covers for springs are made in 20 standard sizes and, according to the Woodworth Specialties Co., Binghamton, N. Y., "the dealer usually charges about \$1 per set for fitting these covers to Fords and from \$2 to 3 for all other cars." Of course, the big idea is to keep the springs well lubricated and free from dust.

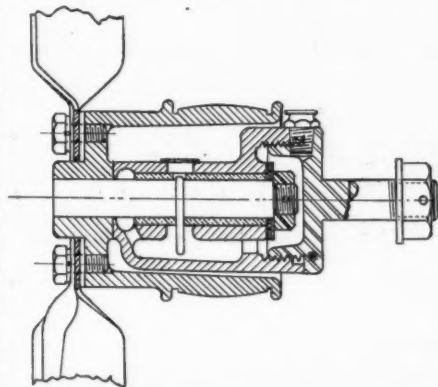


Snow, road, sun and headlight glare were the things the designers of Opto-shield had in mind when they prepared the glass visor shown in the cut. The glass has been carefully treated to prevent these troubles in driving. It is sold



by the Detro Sales Co., Penobscot Bldg., Detroit, at \$5 retail.

"Now is the time to sell car heaters" is probably what we started out to say but for some reason or other couldn't get started and this line we take from a card which the Milwaukee Auto Specialty Mfg. Co., 711 Chestnut Street, Milwaukee, Wis., devotes to their Radio Car Heater. We're going to print a cut of this, too, and perhaps the cut will be able to tell you more clearly just how this device for winter driving works.



The Arrow Pump Co., Buhl Building, Detroit, has placed on the market an automatic fan, the distinguishing feature in which is the "Arrow" Ring Oiled Bearing.

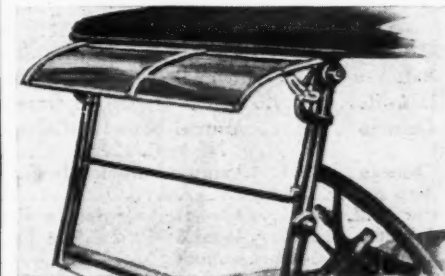
The bearing and oil reservoir in this construction is held stationary. Only the shaft and pulley rotate. This makes it possible to insure that the lubricant will not be thrown out as occurs where the lubricant is contained in the pulley, a rotating part.

Since the oil once introduced cannot escape from the reservoir in the Arrow construction and the ring unfailingly delivers it to the bearing positive lubrication is the result. This bearing will be furnished with the different size fan blades completely arranged at the holding end for passenger cars, trucks and tractors.

National Automobile Spring Lubricating Covers are announced by the National Auto Spring Lubricator Co., 48 Grove Street, West, Somerville 44, Mass. Two features of this cover are a felt pad at the end which keeps in the grease and a tongue so attached as to be in proper place at the bottom, insuring

tightness.

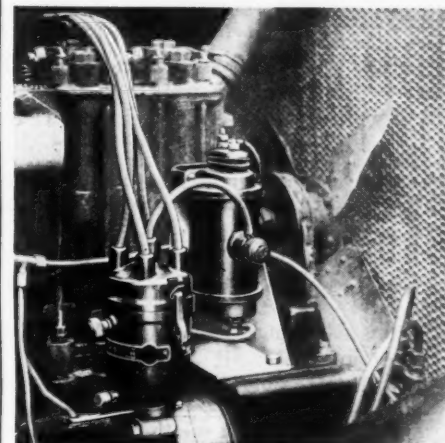
Curvdisc Wheels are made of hard plywoods, laminated with cross grain under pressure and secured with waterproof cement by the Hopkins Mfg. Co., Hanover, Pa. A feature of the Curvdisc wheel is the E-Z Flate valve through which air is introduced to the tube by releasing a small cap nut on the front of the disk. Made in sizes to suit all passenger cars.



Next is the Premier Weather Shield & Glare Visor, the particular boast of which is that one size fits all cars. That's a mighty handy feature. While the Grigsby-Grunow-Hinds Co., 900 W. Lake Street, Chicago, which manufacture it, do not say what it is made of, they do say that "it is lighter and neater than glass and will not break," it sells for \$7.50

The Quaker City Rubber Co., Philadelphia, has introduced a new "No-Rip" inner tube which, according to a report from the factory, is a result of experimenting with many plies of rubber, strengthening them so as to make ripping impossible from a puncture or cut.

These tubes are made in all sizes at various prices and are an addition to the Quaker City company's line of other automotive rubber products.



The American Bosch Magneto Corp., Springfield, Mass., announces that it is placing on the market a battery ignition system designed for use on Chevrolet cars, this system incorporating automatic spark advance.

The prices of the Green Link Fan Belt, the product of the Jewell Belting Co., Hartford, Conn., are 75 cents, \$1 and \$1.50.

COMING MOTOR EVENTS

AUTOMOBILE SHOWS

New York	Annual Show	Jan. 6-13
New York	National Automobile Body Builders' Show	Jan. 8-13
Oakland, Cal.	Fifth Annual Show	Jan. 13-20
Buffalo	Annual Automobile Show	Jan. 13-20
Philadelphia	At the Commercial Museum Bldg.	Jan. 13-20
Hudson, N. Y.	Annual Automobile Show	Jan. 16-20
Cleveland, O.	Annual Winter Show, Cleveland Automobile Mfr's and Dealers' Assn.	Jan. 20-27
Milwaukee	Annual Automobile Show	Jan. 20-27
Baltimore	Annual Automobile Show	Jan. 20-27
Detroit	At the Municipal Garage	Jan. 20-27
Chicago	Annual Show at Coliseum	
	N. A. C. C.	Jan. 27-Feb. 3
Chicago	Annual Automobile Salon	Jan. 27-Feb. 3
Ann Arbor, Mich.		Jan. 29-Feb. 3
Portland, Ore.	Annual Automobile Show	Feb. . .
Atlanta	Annual Automobile Show	Feb. . .
Minneapolis, Minn.	Annual Show	Feb. 3-10
Troy, N. Y.	Annual Automobile Show	Feb. 3-10
Winnipeg, Can.	Minto Barracks	Feb. 5-10
Charlotte, N. C.		Feb. 5-10
Lansing, Mich.		Feb. 5-10
Toledo	Annual Automobile Show	Feb. 5-10
Waterbury, Conn.	Annual Automobile Show	Feb. 5-12
Cincinnati	Automobile Show	Feb. 7-14
Kansas City, Mo.	Annual Automobile Show	Feb. 10-17
St. Louis	St. Louis Automobile Dealers' Assn.	Feb. 12-17

Kalamazoo, Mich.		Feb. 12-17
Flint, Mich.		Feb. 12-17
San Francisco	Exposition, Auditorium	Feb. 17-24
Gr'd Rapids, Mich.		Feb. 19-24
Mt. Clemens, Mich.		Feb. 19-24
Louisville	Annual Automobile Show	Feb. 19-24
Trenton, N. J.	Annual Automobile Show	Feb. 21-24
Brooklyn, N. Y.	Annual Automobile Show of the Brooklyn Motor Vehicle Dealers' Association	Feb. 24-Mar. 3
Muskegon, Mich.		Feb. 26-Mar. 3
Des Moines, Ia.	Annual Show	Feb. 26-Mar. 3
Syracuse, N. Y.	Annual Automobile Show	Feb. 26-Mar. 3
Springfield, Mass.	Annual Automobile Show	Feb. 26-Mar. 3
Omaha	Annual Automobile Show	Feb. 26-Mar. 3
Indianapolis	Indianapolis Automobile Trade Assn.	Mar. 5-10
Bay City, Mich.		Mar. 5-10
Newark, N. J.	Annual Automobile Show	Mar. 10-17
Washington, D. C.	Spring Show, Convention Hall	Mar. 11-17
Port Huron, Mich.		Mar. 12-17
Battle Creek, Mich.		Mar. 19-24
Alpena, Mich.		Apr. 2-7

CONVENTIONS

Chicago	Annual Meeting, Automotive Electric Service Association	Jan. 29-31
Quincy, Ill.	Annual Meeting Illinois Automotive Trade Association	Mar. 19

RACES

San Diego, Calif.		January
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SQUEEKS & RATTLES

If You Know Any, Tell Them to Us

*My Bonnie leaned over the gas tank,
The height of the contents to see;
He lighted a match to assist him;
O, bring back my Bonnie to me.*

*My Bonnie once hired a new chauffeur,
A handsome young devil was he;
They flirted while driving one ev'ning—
Oh, bring back my Bonnie to me.*

Says Tom Walsh, Squeeks & Rattles Indianapolis correspondent, "A wireless control for automobiles is being exhibited in New York. It can be no worse than the brainless variety."

EVEN AS YOU AND I

A fool there was who had worked like heck,
Even as you and I.
He saved his dough till he had a peck,
Then he bought an auto, and made a wreck
Of his hard earned dough, the whole darned peck,
And now he's in debt clear up to his neck,
Even as you and I.

They are using alcohol for motor fuel in France and find it speeds up a car. It also induces speed in America, but the finish line is generally the police court.—Ohio Motorist.

Readers' Clearing House Inquirer wants to know what the "boar" and stroke of his engine is and some wise guy had to suggest that maybe it is pig iron.

Important Announcement—Next week we will introduce the Squeeks & Rattles Readers Cheering House and we defy any man to ask us any question which we cannot answer. If however, you do succeed in stumping us, three prizes are offered and you can have your choice of any: A crocheted umbrella for your gasoline pump; a cardboard wheel puller, or a nice, new emblem symbolizing the spirit of Squeeks & Rattles. Remember, there is NO QUESTION we cannot answer.

A garage in Decatur, Ill. displays this sign in the center of an otherwise bare window:

**We Sell Everything the
Motorist Uses Except
Profanity and
If You Use Our Goods
You Won't Need to Use That**

Get ready your questions for the READERS' CHEERING HOUSE—we will answer all comers. If you think you can stump us, maybe you will change your mind when we tell you that it was us who taught Tom Edison how to ask questions and then went and squeaked the answers to those who thought they were smart.

While we would like the queries to be of an automotive nature, still we feel exceptionally brilliant as we write this and say "Come one, come all, the harder they are, the funnier." All answers will be printed in "Squeeks & Rattles."

Not Yet Broke

COUNTRY JUDGE—"How long have you owned a car?"

MOTORIST (charged with speeding)—"One week, your honor."

JUDGE—"Um—then you can still afford to pay a fine. Twenty dollars."—Boston Transcript.

WRONG GARAGE

"Engine's missing. Guess I need a diagnosis."
"Sorry, boss, but we're plumb out of 'em."—JUDGE.

"Where is the car?" demanded Mrs. Diggs.

"Dear me!" ejaculated Professor Diggs. "Did I take the car out?"

"You certainly did. You drove it to town."

"How odd! I remember now that after I got out I turned around to thank the gentleman who gave me the lift and wondered where he had gone."—The American Legion Weekly.

Specifications of Current Motor Truck Models

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive
				Front	Rear						Front	Rear						Front	Rear	
Acason.....R3	1 1/2	\$1650a	3 1/2x5	34x5n	34x5n	W	Commerce.....18	2 1/2	\$2495	4 1/2x5 1/2	36x6n	40x8n	1	Gary.....K	3 1/2	\$3790	4 1/2x6	36x5	40x5d	W
Acason.....H	2 1/2	1950	3 1/2x5 1/2	36x6	36x6	W	Commerce.....25	2 1/2	2125	4 1/2x5 1/2	36x4	36x7	W	Gary.....M	5	4450	5 1/2x6 1/2	36x6	40x6d	W
Acason.....L	3 1/2	2750	4 1/2x5 1/2	36x4k	36x8k	W	Commerce.....25	2 1/2	2770	4 1/2x5 1/2	36x6	40x8n	W	Gersix.....M	1 1/2	3100	4 1/2x5 1/2	36x3 1/2	36x7	W
Acason.....M	5	3150	4 1/2x5 1/2	36x5k	36x10k	W	Cook.....51	2 1/2	3600	4 1/2x5 1/2	36x6n	40x8n	W	Gersix.....K	2 1/2	3500	4 1/2x5 1/2	36x4	36x8	W
Acason.....11-11	11	4350	5 1/2x6 1/2	36x6	40x12	W	*Corbitt.....3-1	1250	3145	3 1/2x5	33x5n	33x5n	W	Gersix.....20	3 1/2	4500	4 1/2x6	36x5	40x12	W
Ace.....40	2	2400	3 1/2x5	34x3 1/2	34x6	W	Corbitt.....E-22	1	1480	3 1/2x5	34x3 1/2	34x4	W	Gotfredson.....20	1	2075	3 1/2x5 1/2	34x5	34x5	W
Ace.....40-2	2	2850	4 1/2x5 1/2	36x4	36x7	W	Corbitt.....D-22	1 1/2	2200	3 1/2x5	34x3 1/2	34x5	W	Gotfredson.....31	1 1/2	3000	4 1/2x5 1/2	36x6	38x7n	W
Ace.....60	3	3400	4 1/2x5 1/2	36x4	36x8	W	Corbitt.....C-22	2	2600	4 1/2x5 1/2	36x3 1/2	36x7	W	Gotfredson.....A	2 1/2	3375	4 1/2x5 1/2	36x4	36x7	W
Acme.....20	1	.....	3 1/2x5	35x5n	35x5n	W	Corbitt.....B-22	2 1/2	3000	4 1/2x5 1/2	36x4	36x7	W	Gotfredson.....B	3 1/2	4475	4 1/2x5 1/2	36x5	36x10	W
Acme.....30	1 1/2	.....	3 1/2x5	34x3 1/2	34x5	W	Corbitt.....R-22	3	3200	4 1/2x5 1/2	36x4	36x8	W	Gotfredson.....100	5-6	5500	5 1/2x6 1/2	36x6	40x11	W
Acme.....40	2	.....	3 1/2x5	34x3 1/2	34x5	W	Corbitt.....A-22	3 1/2	3800	4 1/2x5 1/2	36x5	36x10	W	Graham Bros.....1	1265	37x4 1/2	33x4 1/2	34x5n	B	
Acme.....60	3	.....	4 1/2x5 1/2	36x4	36x7	W	Corbitt.....AA-22	5	4500	4 1/2x6	36x6	40x6d	W	Graham Bros.....1 1/2	1325	37x4 1/2	33x4 1/2	36x6n	B	
Acme.....60L	3	.....	4 1/2x5 1/2	36x4	36x7k	W								Gramm-Pion.....10	1	1245	3 1/2x5	33x5n	33x5n	B
Acme.....90	4 1/2	.....	4 1/2x5 1/2	36x5	40x10	W								Gramm-Pion.....15	1 1/2	1750a	3 1/2x5	36x3 1/2	36x3k	I
Acme.....125	6 1/2	.....	4 1/2x6	36x6	40x12	W	Day-Elder.....AS	1	1600	3 1/2x5	35x5n	35x5n	W	Gramm-Pion.....65	1 1/2	2250a	3 1/2x5	36x3 1/2	36x5	W
American.....25	2 1/2	3350	4 1/2x6	36x4k	36x4dk	W	Day-Elder.....D	1 1/2	2000	3 1/2x5	34x3 1/2	34x5	W	Gramm-Pion.....20	2-2 1/2	2475a	3 1/2x5 1/2	36x4k	36x7k	W
American.....40	4	4275	4 1/2x6	36x5k	36x5dk	W	Day-Elder.....C	2 1/2	2400	4 1/2x5 1/2	36x4	36x7	W	Gramm-Pion.....30	3	3300a	4 1/2x5 1/2	36x5k	36x5dk	W
American.....50	5	4500	4 1/2x6	36x5k	36x12	W	Day-Elder.....E	3 1/2	2750	4 1/2x5 1/2	36x4	36x7	W	Gramm-Pion.....TSP	3 1/2	4225a	4 1/2x5 1/2	36x6n	42x9n	W
Armleder.....20	1	.....	3 1/2x5 1/2	34x3 1/2	34x6k	W	Day-Elder.....F	5	3150	4 1/2x6	36x5k	40x6dk	W	Gramm-Pion.....50	5-6	4450a	4 1/2x6	36x6	40x6dk	W
Armleder.....21	1 1/2	.....	3 1/2x5 1/2	34x3 1/2	34x6k	W	Dearborn.....E	1	1600	3 1/2x5 1/2	35x5n	35x5n	W							
Armleder.....40-B	1 1/2	.....	4 1/2x5 1/2	34x3 1/2	34x6k	W	Dearborn.....FX	1 1/2	2300	3 1/2x5 1/2	34x4	34x5	W	Hall.....1 1/2	1 1/2	3100	3 1/2x5	34x5n	38x7n	W
Armleder.....40-C	1 1/2	.....	4 1/2x5 1/2	34x3 1/2	34x6k	W	Dearborn.....F	1 1/2	2180	3 1/2x5 1/2	34x4	34x5	W	Hall.....2 1/2	2 1/2	3275	4 1/2x5 1/2	36x4	36x6	W
Armleder.....HW-B	2 1/2	.....	4 1/2x5 1/2	36x4k	36x7k	W	Dearborn.....48	2	2590	3 1/2x5 1/2	34x4 1/2	34x7	W	Hall.....3 1/2	3 1/2	4100	4 1/2x5 1/2	36x5	36x5d	W
Armleder.....HW-C	2 1/2	.....	4 1/2x5 1/2	36x4k	36x7k	W	Defiance.....G	1	1525	3 1/2x5	35x5n	35x5n	B	Hall.....5	5	5100	4 1/2x5 1/2	36x5	40x6d	W
Armleder.....KW-B	3 1/2	.....	4 1/2x6	36x5k	36x5dk	W	Defiance.....D	1 1/2	1845	3 1/2x5	35x5n	36x6n	B	Hall.....7 chain	7	5100	4 1/2x5 1/2	36x5	40x6d	C
Armleder.....KW-C	3 1/2	.....	4 1/2x6	36x5k	36x5dk	W	Denby.....31	1 1/2	1485	3 1/2x5	35x5n	38x7n	W	Harvey.....W	7	2650	4 1/2x5 1/2	34x4	34x7	W
*Atlas.....22	1	1495	3 1/2x5 1/2	34x4 1/2	34x4 1/2	W	Denby.....35	1 1/2	2145	3 1/2x5	35x5n	35x5n	B	Harvey.....WFA	2 1/2	2950	4 1/2x5 1/2	36x4	36x7	W
*Atlas.....44	1 1/2	1950	3 1/2x5 1/2	36x6n	36x6n	W	Dependable.....A	3-1	4295	4 1/2x5 1/2	36x6	40x6d	W	Harvey.....WHA	3 1/2	3950	4 1/2x5 1/2	36x5	36x5d	W
Atterbury.....20R	1 1/2	2475	3 1/2x5	34x3 1/2	34x5	W	Dependable.....C	2	1650	3 1/2x5 1/2	34x3 1/2	34x5	W	Hawkeye.....O	1 1/2	1375	3 1/2x5 1/2	34x5n	34x5n	I
Atterbury.....22C	2 1/2	3375	4 1/2x5 1/2	36x4	36x4d	W	Dependable.....D	2	2650	4 1/2x5 1/2	36x4	36x7	W	Hawkeye.....K	1 1/2	1645	3 1/2x5 1/2	34x3 1/2	34x5k	I
Atterbury.....22D	3 1/2	4275	4 1/2x5 1/2	36x4	36x4d	W	Dependable.....E	2	2650	4 1/2x5 1/2	36x4	36x7	W	Hawkeye.....M	2	2145	4 1/2x5 1/2	36x4k	36x6k	I
Atterbury.....22D	3 1/2	4375	4 1/2x5 1/2	36x5	40x5d	W	Dependable.....F	3	2950	4 1/2x5 1/2	36x4	36x7	W	Hendrickson.....O	1 1/2	1950	3 1/2x5 1/2	34x3 1/2	34x5k	W
Atterbury.....8E	5	4975	4 1/2x6	36x5	40x6d	W	Diamond T.....O-3	1-1 1/2	1975	3 1/2x5 1/2	36x3 1/2	36x4n	W	Hendrickson.....M	2 1/2	2890	4 1/2x5 1/2	36x4k	36x7k	W
Atterbury.....8E	5	5125	4 1/2x6	36x5	40x6d	W	Diamond T.....T	1 1/2	2250	3 1/2x5 1/2	36x3 1/2	36x5	W	Hendrickson.....K	3 1/2	3000	4 1/2x5 1/2	36x5k	36x5dk	W
Autocar.....21UF	1 1/2	1950	3 1/2x5 1/2	34x4k	34x6	D	Diamond T.....U	2-2 1/2	2650	4 1/2x5 1/2	36x4	36x7	W	Huffman.....B	1 1/2	1795	3 1/2x5	34x3 1/2	34x6	W
Autocar.....21UC	1 1/2	2050	3 1/2x5 1/2	34x4k	34x6	D	Diamond T.....K	3 1/2	3750	4 1/2x5 1/2	36x5	36x5d	W	Huffman.....C	1 1/2	1695	3 1/2x5 1/2	34x3 1/2	34x6	I
Autocar.....27H	2-3	2950	4 1/2x5 1/2	34x5	36x7	D	Doane.....2	2	4100b	4 1/2x5 1/2	36x5	36x7	C	Hurlburt.....A-A	2-3	2895	4 1/2x5 1/2	36x4	36x7	W
Autocar.....27K	2-3	3075	4 1/2x5 1/2	34x5	36x7k	D	Doane.....3	2	5100b	4 1/2x5 1/2	36x5	36x5d	C	Hurlburt.....B-B	2-3 1/2	2890	4 1/2x5 1/2	36x4	36x7k	W
Autocar.....26Y	4-6	3950	4 1/2x5 1/2	34x6	36x12	D	Doane.....6	6	6000b	5 1/2x6	36x6	40x6d	C	Hurlburt.....C-C	3-3 1/2	3475	4 1/2x5 1/2	36x5	36x5d	W
Autocar.....26-B	4-6	4100	4 1/2x5 1/2	34x6	36x12	D	*Dodge Brothers.....3	730	37x4 1/2	32x4n	32x4n	B	Hurlburt.....D-D	1-4 1/2	4150	4 1/2x6	36x5	36x6d	W	
Available.....H1 1/2	1 1/2	2475	4 1/2x5 1/2	36x3 1/2	36x5k	W	Dorris.....K-2	1	2490	4 1/2x5 1/2	36x4	36x7	W	Hurlburt.....E-E	5-6 1/2	4850	4 1/2x6 1/2	36x6	40x6d	W
Available.....H2	2	2775	4 1/2x5 1/2	36x3 1/2	36x6k	W	Dorris.....K-4	2-2 1/2	3400	4 1/2x5 1/2	36x4	36x7	W							
Available.....H2 1/2	2 1/2	3160	4 1/2x5 1/2	36x4k	36x8k	W	Dorris.....K-7	3 1/2	4400	4 1/2x5 1/2	36x5	36x10	W							
Available.....H3 1/2	3 1/2	3475	4 1/2x5 1/2	36x5	40x5d	W	*Dort.....103	685a	3 1/2x5	31x4n	34x4n	B	Indep'd (Iowa).....B	1	1665	3 1/2x5	34x3 1/2	34x4	I	
Available.....H5	5	5375	5 1/2x6	36x6	40x12	W	Double Drive.....B	3	4000	4 1/2x5 1/2	36x6	36x6	W	Indep'd (Iowa).....HI	1 1/2	2040	3 1/2x5 1/2	34x3 1/2	34x5	I
*Avery.....1	1	.....	3 1/2x5	34x5n	34x5n	I	Duplex.....A	2	2775	4 1/2x5 1/2	35x5n	38x7n	W	Indep'd (Ia.).....10	1	2940	4 1/2x5 1/2	36x4	36x7	I
Beck.....A Jr.	1 1/2	1285a	3 1/2x5	34x4 1/2	34x4 1/2	I	Duplex.....E	3 1/2	3500	4 1/2x5 1/2	36x8	36x8	W	Indiana.....12	1 1/2	.....	3 1/2x5 1/2	34x3 1/2	34x5n	B
Beck.....B-30	1 1/2	1350	3 1/2x5	34x5	36x6	I	Duty.....22	2	1590	3 1/2x5	34x3 1/2	34x5	I	Indiana.....20	2	.....	3 1/2x5 1/2	36x4k	36x7k	W
Beck.....C																				

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL										NAME AND MODEL										NAME AND MODEL									
Tons Capacity		Chassis Price	TIRES		Final Drive	Tons Capacity		Chassis Price	TIRES		Final Drive	Tons Capacity		Chassis Price	TIRES		Final Drive												
Front	Rear		Front	Rear		Front	Rear		Front	Rear																			
Kleiber BB	2	\$3600	4 1/2 x 5 1/4	36x4k	36x7k	W	Ogden D	1 1/2	.....	3 1/2 x 5	36x3 1/2	36x5	W	Selden 70	3 1/2-5	\$3750	4 1/2 x 5 1/2	36x5	36x10	W								
Kleiber B	2 1/2	3950	4 1/2 x 5 1/2	36x5k	36x8	W	Ogden E	2 1/2	.....	4 1/2 x 5 1/4	36x4	36x8	W	Selden 90	5-7	4950	4 1/2 x 6	36x6	40x12	W								
Kleiber C	3 1/2	4600	4 1/2 x 5 1/2	36x5	36x5d	W	Old Hickory W	1	\$1775	3 1/2 x 5	36x3 1/2	36x4k	W	Seneca M	1 1/2	820	3 1/2 x 4 1/2	30x3 1/2	30x3 1/2	B									
Kleiber D	5	5300	5 x 6 1/2	36x6	40x12	W	Old Reliable A	1 1/2	2350	4 x 5	34x4	36x6	W	*Service 12	3 1/2	.....	3 1/2 x 4 1/2	32x4 1/2	32x4 1/2	B								
Koehler D	1 1/2	2150	3 1/2 x 5	34x3 1/2	34x5	W	Old Reliable B	1 1/2	3500	4 1/2 x 5	34x4	36x4d	W	*Service 25	1 1/2	.....	3 1/2 x 5 1/2	34x5n	34x5n	B								
Koehler M	2 1/2	3175	4 x 5 1/2	36x4	36x7	W	Old Reliable C	3 1/2	4250	4 1/2 x 6	36x5	36x5d	W	*Service 21	1 1/2	.....	3 1/2 x 5 1/2	34x3 1/2	34x5	W								
Koehler MCS	2 1/2	3275	4 x 5 1/2	36x4	36x7	W	Old Reliable D	5	5000	4 1/2 x 6	36x6	40x6d	W	*Service 32	2	.....	4 x 5 1/2	36x3 1/2	36x7	W								
Koehler F	3 1/2	4470	4 1/2 x 5 1/2	36x5	36x10	W	Old Reliable KLM	7	6000	4 1/2 x 6 1/4	36x6	40x7d	W	*Service 37	2	.....	4 1/2 x 5 1/2	35x5n	38x7n	W								
Koehler MT Trac	5	3275	4 x 5 1/2	36x4	36x7	W	*Oldsmobile Econ	1	1095	3 1/2 x 5 1/2	35x5n	35x5n	I	*Service 52	3	.....	4 1/2 x 5 1/2	36x1	36x8	W								
Krebs 23	3 1/2	1360	3 1/2 x 5	34x4 1/2	34x4 1/2	B	Olympic A	2 1/2	3200	4 1/2 x 5 1/2	36x4	36x8	W	*Service 72	3 1/2	.....	4 1/2 x 5 1/2	36x5	36x5d	W								
Krebs 24	1	1675	3 1/2 x 5	34x5	34x5	W	Onida B9	1 1/2	2825	4 x 5 1/4	36x3 1/2	36x7	W	*Service 77	4	.....	4 1/2 x 5 1/2	36x5	36x5d	W								
Krebs 45	1 1/2	2275	4 1/2 x 5 1/2	36x4	36x7	W	Onida C9	2 1/2	3200	4 x 5 1/4	36x4	36x8	W	*Service 102	6	.....	4 1/2 x 5 1/2	36x6	40x6d	W								
Krebs 75	2 1/2	2550	4 1/2 x 5 1/2	36x4	36x8	W	Onida D9	3 1/2	4050	4 1/2 x 5 1/2	36x5	36x10	W	Signal NF	1	1450	3 1/2 x 5 1/2	34x5n	36x6n	W									
Krebs 110	3 1/2	3175	4 1/2 x 5 1/2	36x5	40x10	W	Onida E9	5	4725	4 1/2 x 5 1/2	36x6	40x12	W	Signal H	1 1/2	1950	4 1/2 x 5 1/2	34x4	36x6	W									
Krebs 140	5	.....	4 1/2 x 6	36x6	40x6d	W	Oshkosh A	2	2485	3 1/2 x 5	36x6n	36x6n	B	Signal J	2 1/2	2375	4 1/2 x 5 1/2	34x4	36x8	W								
Larrabee X-2	1	1925	3 1/2 x 4 1/2	34x5n	34x5n	B	Oshkosh AA	2	2585	3 1/2 x 5	36x6n	36x6n	B	Signal M	3 1/2	3175	4 1/2 x 5 1/2	36x5	40x5d	W									
Larrabee U	1 1/2	2400	3 1/2 x 5	34x3 1/2	34x5	W	Oshkosh BB	2 1/2	3485	4 x 5 1/4	38x7n	38x7n	B	Signal R	5	3900	4 1/2 x 5 1/2	36x6	40x6d	W									
Larrabee J	1 1/2-2 1/2	2400	3 1/2 x 5	34x3 1/2	34x5k	W	*Overland 4	1 1/2	425	3 1/2 x 5	30x3 1/2	30x3 1/2	B	*Standard 75	1 1/2	1330	3 1/2 x 5	33x5n	33x5n	W									
Larrabee K	2 1/2-3 1/2	3100	4 1/2 x 5 1/2	36x4	36x7	W	Packard EC	2-3	3100	4 1/2 x 5 1/2	36x4	36x7	W	*Standard 1-K	1 1/2	1600	3 1/2 x 5	34x3 1/2	34x5k	W									
Larrabee K-5	2 1/2-3 1/2	3450	4 1/2 x 5 1/2	36x4	36x8	W	Packard ED	3 1/2-4 1/2	4100	4 1/2 x 5 1/2	36x5	36x5d	W	*Standard 76	2 1/2-3	2400	4 1/2 x 5 1/2	36x4k	36x8	W									
Larrabee L-4	3 1/2-5	4000	4 1/2 x 5 1/2	36x5	36x5d	W	Packard EF	5-7 1/2	4500	5 x 6 1/2	36x6	40x6d	W	*Standard 66	3 1/2	3150	4 1/2 x 5 1/2	36x5	36x12	W									
Larrabee W	5-7	4800	4 1/2 x 6	36x6	40x6d	W	Packard EF	5-7 1/2	4500	5 x 6 1/2	36x6	40x6d	W	*Standard 5-K	5-7	4400	4 1/2 x 6	36x6	40x14	W									
Maccar L	1 1/2	.....	4 1/2 x 5 1/2	36x4	36x6	W	Packard EX	2-3	3100	4 1/2 x 5 1/2	36x4	36x7	W	*Star 1	1 1/2	610b	3 1/2 x 4 1/2	30x3 1/2	30x3 1/2	W								
Maccar H-A	2	.....	4 1/2 x 5 1/2	36x4	36x4d	W	Packard EX	2-2 1/2	3100	4 1/2 x 5 1/2	36x6n	40x8n	W	Sterling 1 1/2	1 1/2	2885	1 x 5 1/2	36x3 1/2	36x5k	W								
Maccar H-2	3	.....	4 1/2 x 5 1/2	36x4	36x5d	W	Packard ED	3 1/2-4 1/2	4100	4 1/2 x 5 1/2	36x5	36x5d	W	Sterling 2	2	3085	1 x 5 1/2	36x1k	36x6k	W								
Maccar M-3	4	.....	4 1/2 x 5 1/2	36x5	36x6d	W	Paige 52-19	1 1/2	1950	1 x 5 1/2	34x3 1/2	34x5	W	Sterling 2 1/2	2 1/2	3290	4 1/2 x 5 1/2	36x1k	36x4dk	W								
Maccar G	5-6	.....	4 1/2 x 6	36x5	40x6d	W	Paige 54-20	2 1/2	2420	1 1/2 x 5 1/2	34x4	34x8	W	Sterling 3 1/2	3 1/2	4325	4 1/2 x 5 1/2	36x5k	40x5dk	W								
MacDonald A	1 1/2	5750	4 1/2 x 6	40x7	40x14	I	Paige 51-18	3 1/2	3145	1 1/2 x 5 1/2	36x5	36x5d	W	Sterling 5-W	5	4950	5 x 6 1/4	36x6	40x6d	W									
Mac AB D.R.	1 1/2	3450	4 x 5	36x4k	36x3 1/2dk	D	Parker C-22	1	1875	3 1/2 x 5 1/2	34x5n	34x5n	W	Sterling 5-C	5	5500	5 x 6 1/4	36x6	40x6d	C									
Mac AB Chain	1 1/2	3000	4 x 5	36x4k	36x3 1/2dk	D	Parker G-22	2 1/2	3200	1 1/2 x 6	34x4	36x4d	W	Sterling 7 1/2	7 1/2	6000	5 x 6 1/4	36x6	40x7d	C									
Mac AB Chain	2	3750	4 1/2 x 5	36x4k	36x4dk	C	Parker J-20	3	3950	1 1/2 x 6	36x5	40x5d	W	*Stewart Utility	1 1/2-1 1/2	1215	3 1/2 x 5 1/2	34x4 1/2	34x4 1/2	I									
Mac AB D.R.	2 1/2	3850	4 1/2 x 5	36x4k	36x4dk	D	Parker M-20	5	4850	5 x 6	36x6	40x6d	W	Stewart 15	1 1/2-1 1/2	1145	3 1/2 x 5 1/2	35x5n	35x5n	I									
Mac AC Chain	2 1/2	3400	4 1/2 x 5	36x4k	36x4dk	C	Patriot Revere	1	1380	3 1/2 x 5	35x5n	35x5n	W	Stewart 9	9	1790	3 1/2 x 5 1/2	34x3 1/2	34x6	I									
Mac AC Chain	3 1/2	4950	5 x 6	36x5k	40x5dk	C	Patriot Lincoln	2	2050	1 x 5 1/2	34x4	34x6	W	Stewart 7-X	7 1/2-8 1/2	2330	4 1/2 x 5 1/2	34x4	34x8	I									
Mac AC Chain	5	5500	5 x 6	36x6	40x6d	C	Patriot LS-800	2	2175	1 x 5 1/2	34x4	34x6	W	Stewart 10-X	10 1/2-11 1/2	3190	4 1/2 x 6	36x5	36x10	I									
Mac AC Chain	6 1/2	5750	5 x 6	36x6	40x12	C	Patriot Wash'tn	3	2900	1 1/2 x 5 1/2	36x5	36x7	W	*Stewart C	3 1/2	1095	1 1/2 x 5 1/2	34x4 1/2	34x4 1/2	B									
Mac AC Chain	7 1/2	6000	5 x 6	36x6	40x12	C	Pierce-Arrow 2	2	3200	4 1/2 x 5 1/2	36x4	36x4d	W	Stoughton A	1	1790	3 1/2 x 5 1/2	34x5n	34x5n	W									
Mac Trac AB	5	3400	4 1/2 x 5	36x4	36x4d	C	Pierce-Arrow 3 1/2	3 1/2	4350	4 1/2 x 5 1/2	36x5	36x5d	W	Stoughton B	1 1/2	2150	4 1/2 x 5 1/2	36x3 1/2	36x5	W									
Mac Trac AC	7	4950	5 x 6	36x5	40x5d	C	Pierce-Arrow 5	5	4850	4 1/2 x 5 1/2	36x5	40x6d	W	Stoughton D	2	2490	4 1/2 x 5 1/2	36x4	36x7	W									
Mac Trac AC	10	5500	5 x 6	36x6	40x6d	C	Pittsburgher 1 1/2-2	1 1/2-2	3800	4 1/2 x 5 1/2	36x4	36x6	W	Stoughton F	3	3150	4 1/2 x 5 1/2	36x5d	36x5d	W									
Mac Trac AC	13	5750	5 x 6	36x6	40x12	C	Pittsburgher 3	3	3800	4 1/2 x 5 1/2	36x5k	36x7	W	Sullivan E	2	2800	4 1/2 x 5 1/2	36x4k	36x7k	W									
Mac Trac AC	15	6000	5 x 6	36x7	40x7d	C	Power F	2	3150	1 1/2 x 5 1/2	36x5	36x7	W	Sullivan H	3 1/2	3750	4 1/2 x 6	36x5	36x5d	W									
*Mapleleaf	1 1/2	3000	3 1/2 x 5 1/2	34x5n	36x6n	W	Power C	3 1/2	3150	1 1/2 x 5 1/2	36x5	40x10	W	*Thomart	1 1/2	1795	1 x 5 1/2	34x5	34x5	C									
Mapleleaf AA**	2	3600	4 x 5 1/4	36x4	36x7	W	Premocar B-143	1 1/2	2475	3 1/2 x 5	36x6n	36x6n	W	Tiffin GW	1 1/2	2100	1 1/2 x 5 1/2	36x3 1/2	36x5	W									
Mapleleaf BB**	3	4050	4 1/2 x 5 1/2	36x4	36x4d	W	*Rainier R-21	3 1/2	.....	3 1/2 x 5	35x5n	35x5n	W	Tiffin MW	2 1/2	2700	1 1/2 x 5 1/2	36x4	36x3 1/2	W								
Mapleleaf CC**	4	4800	4 1/2 x 5 1/2	36x5	36x5d	W	Rainier R-26	1 1/2	.....	3 1/2 x 5	34x3 1/2	34x4	W	Tiffin PW	3 1/2	3300a	1 1/2 x 5 1/2	36x5	40x5d	W								
Mapleleaf DD**	5	5625	4 1/2 x 5 1/2	36x6	40x6d	W	Rainier R-28	2	.....	1 1/2 x 5 1/2	34x4	34x6	W	Tiffin UW	6	4500	1 1/2 x 6	36x6	40x6d	W								
Mason 1	1200	4 x 5	34x5n	34x5n	B	Rainier R-20	2 1/2-3	.....	1 1/2 x 5 1/2	34x4	34x7	W	Titan 2	2	2750	1 x 5	36x4k	36x7k	D									
Master JW																													

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive
				Front	Rear						Front	Rear						Front	Rear	
Veteran.....P**	2	\$3699	4 1/2 x 5 1/2	36x4	36x7	W	White.....40	3 1/2	\$4200	3 1/2 x 5 1/2	36x5	40x5d	D	Wichita.....O	4	\$3500	4 1/2 x 5 1/2	36x5k	36x5k	W
Veteran.....R**	3	4200	4 1/2 x 5 1/2	36x4	36x7	W	White.....45	5	4500	4 1/2 x 5 1/2	36x6	40x6d	D	Wilcox.....AA	1	1900	3 1/2 x 5 1/2	36x4k	36x4k	W
Veteran.....S**	4	5395	4 1/2 x 6	36x5	36x10	W	White Hick.....E	1	1225	3 1/2 x 5	34x5n	34x5n	W	Wilcox.....BB	1 1/2	2550	4 1/2 x 5	36x4	36x5	W
*Vim.....50	1/2-3/4	995	4 x 5	32x4n	32x4n	B	White Hick.....H	1 1/2	1375	3 1/2 x 5	36x3 1/2	36x5	W	Wilcox.....D	2 1/2	3000	4 1/2 x 5	36x4k	36x3 1/2 dkW	
Walker-JohnsonA	2	2500	3 1/2 x 5	34x3 1/2	34x6	W	White Hick.....K	2 1/2	1675	4 1/2 x 5 1/2	36x4	38x5	W	Wilcox.....E	3 1/2	3950	4 1/2 x 5 1/2	36x5k	36x5dk W	
Walker-JohnsonB	3	3000	4 1/2 x 5 1/2	36x4	36x8	W	Wichita.....K	1	1875	3 1/2 x 5 1/2	36x3 1/2	36x4k	W	Wilcox.....F	5	4350	4 1/2 x 5 1/2	36x5	40x6d	W
Walter.....M	2 1/2	3850	4 1/2 x 5 1/2	36x4	36x8	W	Wichita.....M	2	2400	3 1/2 x 5 1/2	36x3 1/2	36x6k	W	Wilson.....EA	2 1/2	2825	4 1/2 x 5 1/2	36x4	36x7	W
Walter.....S	5	4850	4 1/2 x 5 1/2	36x6	40x6d	W	Wichita.....RX	3	3200	4 1/2 x 5 1/2	36x4k	36x8k	W	Wilson.....G	3 1/2	3685	4 1/2 x 5 1/2	36x5	36x5	W
*Watson.....C	1	1465a	3 1/2 x 5 1/2	35x5n	35x5n	W	FINAL DRIVE:—B—Bevel, C—Chain, D—Double Reduction, I—Internal Gear, W—Worm.													
Watson.....N	3 1/2	4250	4 1/2 x 5 1/2	36x5	36x10	W														
Western.....W1 1/2	1 1/2	2450	4 1/2 x 5 1/2	36x3 1/2	36x5k	W	r—8 cyl. s—6 cyl. t—2 cyl.—all others are 4 cyl. d—dual tires.							*Wisconsin.....A	1	1750	3 1/2 x 5	34x5n	34x5n	W
Western.....L1 1/2	1 1/2	2450	3 1/2 x 5	36x3 1/2	36x5k	W	k—pneumatic tires optional at extra cost. n—pneumatic tires.							Wisconsin.....B	1 1/2	2100	3 1/2 x 5	35x5	36x6	W
Western.....W2 1/2	2 1/2	3250	4 1/2 x 5 1/2	36x4	36x7	W	a—price includes several items of equipment. b—price includes body. *—express truck or delivery wagon. **—Canadian							Wisconsin.....C	2 1/2	2700	4 x 5 1/2	36x6n	36x7	W
Western.....L2 1/2	2 1/2	2450	4 1/2 x 5	36x4	36x7	W	Make. trac.—tractor.							Wisconsin.....D	3 1/2	3000	4 1/2 x 5 1/2	36x6n	40x8	W
Western.....W3 1/2	3 1/2	4000	4 1/2 x 6	36x5	40x5d	W								Wisconsin.....E	5	3500	4 1/2 x 5 1/2	36x6	36x10	W
*White.....15	1 1/2	2400	3 1/2 x 5 1/2	34x5n	34x5n	B								Wisconsin.....F	7	4000	5 x 6 1/2	36x8	36x12	W
White.....20	2	3250	3 1/2 x 5 1/2	36x4k	36x7k	D								Witt-Will.....N	1 1/2	2450	3 1/2 x 5	36x3 1/2	36x6k	W
														Witt-Will.....P	2 1/2	2900	4 1/2 x 5 1/2	36x4k	36x8k	W

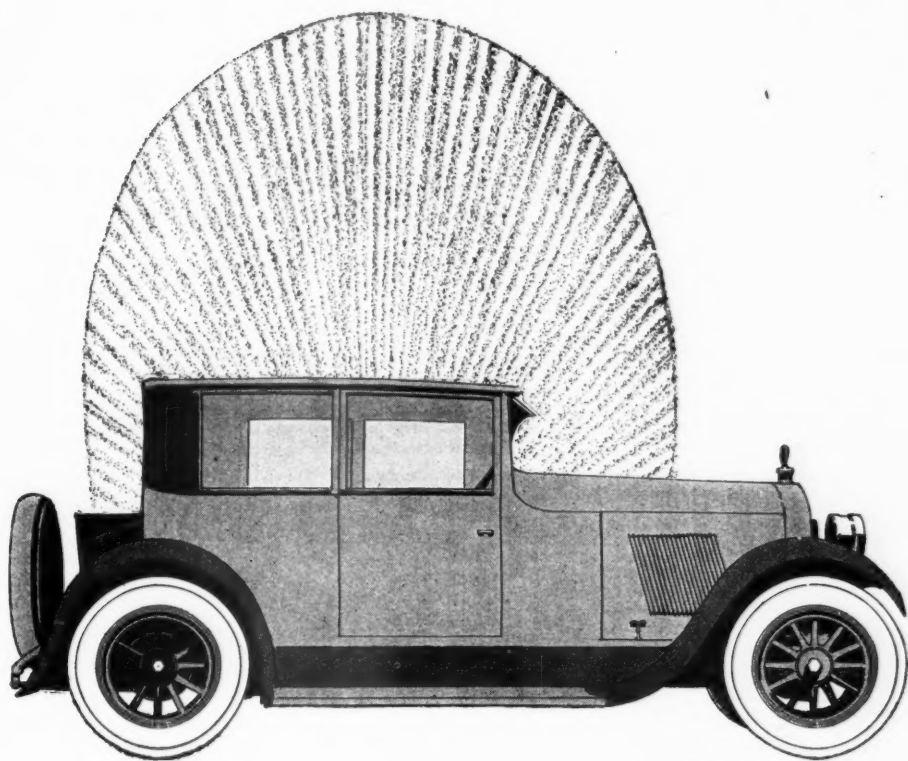
Specifications of Current Farm Tractor Models

TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders; Bore, Stroke	Fuel	Plow Capacity	TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders; Bore, Stroke	Fuel	Plow Capacity	TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders; Bore, Stroke	Fuel	Plow Capacity
Allis-Chal.G.P.	6-12	\$250	2	LeR.	4-3 1/2 x 4 1/2	Gas.	1	Frick.....A	12-20	....	4	Erd.	4-4 x 6	G,K	2-3	OilPull.....E	30-60	....	4	Own	2-10x12	K,D	8-10
Allis-Chalm.	15-25	1185	4	Midw.	4-4 1/2 x 5 1/2	Gas.	3	Frick.....C	15-28	....	4	Beav.	4-4 1/2 x 6	G,K	3-4	*Oldsmar.....K	2 1/2-5	\$225	4	Own	1-5 1/2 x 5 1/2	Gas.	1
Allis-Chalm.	20-35	1885	4	Own	4-4 1/2 x 6 1/2	GorK	3-4																
Allis-Chalm.	20-35	2085	4	Own	4-4 1/2 x 6 1/2	G	4																
Allwork.....2-G	14-28	1595	4	Own	4-4 1/2 x 6	GorK	3	Grain Belt.....A	18-36	\$2150	4	Wauk.	4-4 1/2 x 6 1/2	GorK	4	Pioneer.....G	18-36	....	4	Own	4-5 1/2 x 6	G,K,D	4
Allwork.....C	14-28	1395	4	Own	4-5 x 6	GorK	3	Gray.....	20-36	1975	3	Wauk.	4-4 1/2 x 6 1/2	Gas.	4	Pioneer.....C	40-75	....	4	Own	4-7 x 8	Gas.	10
*ARO.1921-22	3-6	385	4	Own	1-4 1/2 x 5	Gas.	1	Gray.....	22-44	2165	3	Wauk.	4-5 x 6 1/2	Gas.	4-5								
Aultman-T.....	15-30	1900	4	Clim.	4-5 x 6 1/2	G,K,D	4	Gt. WesternSt	20-30	1950	4	Beav.	4-4 1/2 x 6	K	4								
Aultman-T.....	22-45	2800	4	Own	4-5 1/2 x 8	G,K,D	6																
Aultman-T.....	30-60	4000	4	Own	4-7 x 9	G,K,D	8-10																
Automot.....B-3	12-24	1250	4	Here.	4-4 x 5 1/2	Gas.	2-3																
Avery,SR,Cul.	5-10	....	4	Own	4-3 x 4	G,K	..																
Avery Cult-C	5-10	....	3	Own	6-3 x 4	G,K	..	Hart-Parr.....20	20	865	4	Own	2-5 1/2 x 6 1/2	K,D	2	Russell.....	12-24	1500	4	Own	4-4 1/2 x 5 1/2	GorK	2-3
Avery.....B	5-10	....	4	Own	4-3 x 4	G,K	..	Hart-Parr.....30	30	1045	4	Own	2-6 1/2 x 7	K,D	3	Russell.....	15-30	2200	4	Own	4-5 1/2 x 6 1/2	GorK	3-4
Avery.....C	5-10	....	4	Own	6-3 x 4	G,K	..	Heider.....D	9-16	628	4	Wauk.	4-4 1/2 x 5 1/2	K,D	2	Russell.....	20-35	3000	4	Own	4-5 1/2 x 7	GorK	4-5
Avery.....8-16	....	....	4	Own	2-5 1/2 x 6	G,K,D	2-3	Heider.....C	12-20	725	4	Wauk.	4-4 1/2 x 6 1/2	G,K	3	Russell.....	30-60	5000	4	Own	4-8 x 10	GorK	8-10
Avery.....12-20	....	....	4	Own	4-4 1/2 x 6	G,K,D	2-3	Heider.....Cult	5-10	800	4	LeR.	4-3 1/2 x 4 1/2	Gas.	1								
Avery.....12-25	....	....	4	Own	2-6 1/2 x 7	G,K,D	2-3	Huber Light 4	12-25	985	4	Wauk.	4-4 1/2 x 5 1/2	GorK	3	Samson.....M	....	445	4	Own	4-4 x 5 1/2	G,K	2
Avery.....14-28	....	....	4	Own	4-4 1/2 x 7	G,K,D	3-4	Huber Super 4	15-30	1885	4	Midw.	4-4 1/2 x 6	Gas.	3								
Avery.....18-36	....	....	4	Own	4-5 1/2 x 6	G,K,D	4-5																
Avery.....25-50	....	....	4	Own	4-6 1/2 x 7	G,K,D	5-6																
Avery.....45-65	....	....	4	Own	4-7 1/2 x 8	G,K,D	8-10																
								Indiana.....F	5-10	665	2	LeR.	4-3 1/2 x 4 1/2	Gas.	1-2	Toro Cultivator	6	750	3	LeR.	4-3 1/2 x 4 1/2	Gas.	2
								International.	8-16	7670	4	Own	4-4 1/2 x 5	G,K,D	2	Toro Tractor 22	6-10	495	3	LeR.	4-3 1/2 x 4 1/2	Gas.	2
								Internat.Titan	10-20	7700	4	Own	2-6 1/2 x 8	G,K,D	3	Townsend.....	10-20	800	2	Own	4-6 1/2 x 7	Ker.	2-3
								International.	15-30	1750	4	Own	4-5 1/2 x 8	G,K,D	4	Townsend.....	15-30	1350	2	Own	4-7 x 8	Ker.	3-4
Bates Mule.H	15-25	....	4	Midw.	4-4 1/2 x 5 1/2	Gas.	3	*Kinkade.....	1 1/2-3	190	1	Own	1-3 x 3	Gas.	..	Townsend.....	25-50	2500	2	Own	4-8 x 10	Ker.	4-6
Bates Mule..F	18-25	....	*2	Midw.	4-4 1/2 x 5 1/2	Gas.	3									Traction Motor	40-50	....	4	....	8-3 1/2 x 5	Gas.	4-5
Bates Mule..G	25-35	4250	*2	Midw.	4-4 1/2 x 6 1/2	Gas.	4									Traylor.....TB	6-12	500	4	LeR.	4-3 1/2 x 4 1/2	Gas.	1-2
Beaman Jr.....	3 1/2-13 1/2	180	2	B&S	1-2 1/2 x 4 1/2	Gas.	4									Trundaar.....10	25-40	3750	*2	Wauk.	4-5 x 6 1/2	GorK	4
Beaman.....G	2-4	240	4	Own	1-3 1/2 x 4 1/2	Gas.	4	La Crosse.....	12-24	985	2	Own	2-6 x 7	G,K	3	Twin City.....	12-20	1200	4	Own	4-4 1/2 x 6	H,K	3
Best.....30	....	....	*2	Own	4-4 1/2 x 6 1/2	G,K,D	4	Lauson.....5	12-25	1295	4	Midw.	4-4 1/2 x 5 1/2	Gas.	3	Twin City.....	20-35	2750	4	Own	4-5 1/2 x 6 1/2	G,K	5-6
Best.....60	....	....	*2	Own	4-4 1/2 x 6 1/2	G,K,D	8-9	Lauson.....21	15-30	1675	4	Beav.	4-4 1/2 x 6	GorK	3-4	Twin City.....	40-65	4750	4	Own	4-7 1/2 x 10	G,K	8-10
*Bolens.....	....	....	4	B&S	1-2 1/2 x 4 1/2	G.	..	Lauson Road	15-30	2000	4	Beav.	4-4 1/2 x 6	K	3-4	Uncle SamC20	12-20	1295	4	Weid.	4-4 x 5 1/2	G	2-3
Boring.....	5-10	395	4	LeR.	4-3 1/2 x 4 1/2	G.	..	Leader.....B	12-18	685	4	Own	2-6 x 6 1/2	G,K,D	2-3	Uncle SamB19	20-30	1985	4	Beav.	4-4 1/2 x 6	GorK	3-4
Boring.....1921	....	1850	3	Wauk	4-4 1/2 x 5 1/2	GorK	2	Leader.....N	16-32	1725	4	Clim.	4-5 x 6 1/2	G,K	3-4	Utilitor.....501	20-30	1895	4	Beav.	4-4 1/2 x 6	GorK	3-4
*Bryan.....	15-30	....	4	Own	2-4 x 5	K.	3	Leader.....GU	18-35	2150	*2	Clim.	4-5 x 6 1/2	G,K	3-4	Utilitor.....501A	2 1/2-4	340	4	Own	1-3 1/2 x 4 1/2	G	1
								Little Giant..B	16-22	2200	4	Own	4-4 1/2 x 5	K	4	Wallis.....K	15-25	....	4	Own	4-4 1/2 x 5 1/2	G,K	3
								Little Giant..A	26-35	3300	4	Own	4-5 1/2 x 6	K	6	Waterloo.....N	12-25	675	4	Own	2-6 1/2 x 7	Ker.	3
								Lombard.1922	85-150	8950	*2	Wisc.	6-5 1/2 x 6 1/2	Gas.	16	Wetmore21-22	12-25	1185	4	Wauk.	4-4 x 5 1/2	G,K	3
								Lombard.1922	50	5300	*2	Wisc.	4-4 1/2 x 6 1/2	Gas.	6-10	Whitney.....D	9-18	595	4	Own	2-5 1/2 x 6 1/2	Gas.	2
																Wichita.....T	15-30	2000	4	Beav.	4-4 1/2 x 6	G,K,D	3-4
Case.....	12-20	1050	4	Own	4-4 1/2 x 5	G,K,D	2-3	MerryGar1922	2	210	2	Evin	1-2 1/2 x 2 1/2	Gas.	..	Wisconsin.....E	16-30	1850	4	Clim.	4-5 x 6 1/2	GorK	3
Case.....	15-27	1320	4	Own	4-4 1/2 x 6	G,K,D	3-4	Minne.....All-P	12-25	800	4	Own	4-4 1/2 x 7	GorK	3-4	Wisconsin.....F	20-40	2050	4	Wauk.	4-5 x 6 1/2	GorK	4
Case.....	22-40	2550	4	Own	4-4 1/2 x 6 1/2	G,K,D	4-5	Minne.....Gen-P	17-30	1600	4	Own	4-4 1/2 x 7	GorK	3-4	Wisconsin.....H	22-40	2550	4	Clim.	4-5 1/2 x 7	GorK	4-6
Case.....	40-72	5200	4	Own	7 x 8	G,K,D	8-10	Minne.Med.D	22-44	2650	4	Own	4-6 x 7	GorK	5-6	Yuba.....12-20	12-20	2400	*2	Wauk.	4-4 1/2 x 6 1/2	G,K,D	3
Caterpillar T35	15	....	*2	Own	4-4 x 5 1/2	Gas.	3	MinneHeavyD	35-70	3850	4	Own	4-7 1/2 x 9	GorK	8-9	Yuba.....15-25	15-25	2750	*2	Wisc.	4-4 1/2 x 6	G,K,D	..
Caterpillar..5T	25	....	*2	Own	4-4 1/2 x 6	Gas.	4	Mohawk.1922	8-16	650	2	Light	4-3 1/2 x 4 1/2	KorG	1-2	Yuba.....20-35	20-35	3900	*2	Wisc.	4-5 1/2 x 7	G,K,D	4
Caterpillar 10T	40	....	*2	Own	4-6 1/2 x 7	Gas.	6	Moline Univ D	9-18	650	2	Own	4-3 1/2 x 5	Gas.	2-3	Yuba.....25-40	25-40	4250	*2	Wisc.	4-5 1/2 x 7	G,K,D	..
Centaur.....	5-2 1/2	345	2	N Way	2-4 1/2 x 4 1/2	GorK	1	Moline Orch..	9-18	....	2	Own	4-3 1/2 x 5	Gas.	2-3	†Yuba.....	25-40	4750	*2	Yuba	4-5 1/2 x 7	D	..
Cetrac.....F	9-16	595	*2	Own	4-3 1/2 x 4 1/2	G,K,D	2	*Monarch.....	20-30	3500	*2	Beav.	4-4 1/2 x 6	G,K,D	4								
Cetrac.....W	12-20	1345	*2	Own	4-4 x 5 1/2	G,K,D	2-3	Motor Macult.	1 1/2	195	2	Own	1-2 1/2 x 3 1/2	Gas.	..								
Dakota.....4	15-27	1500	3	Dom.	4-4 1/2 x 6	Gas.	3	NB.....1	3-6	375	4	Own	2-3 1/2 x 4	Gas.	1								
Do-It-All,Baby	1	237	..	Own	1-2 1/2 x 2 1/2	Gas.	1	Nichols-Shep.	20-42	2650	4	Own	2-8 x 10	GorK	3-6								
Do-It-All.....A	3-6	495	..	Own	1-1 1/2 x 5	Gas.	1	Nichols-Shep.	25-50	3000	4	Own	2-9 x 12	GorK	4-8								
Do-It-All,Jack	6	395	..	Own	1-3 1/2 x 4 1/2	Gas.	1	Nichols-Shep.	35-70	3650	4	Own	2-10 1/2 x 14	GorK	8-12								
Do-It-All.....6	12	495	2	Own	2-3 1/2 x 4 1/2	Gas.	1	Nilson Senior.	20-40	1975	5	Wauk.	4-5 x 6 1/2	G,K	4								
Eagle.....F	12-22	....	4	Own	2-7 x 8	GorK	3-4																
Eagle.....H	16-30	....	4	Own	2-8 x 8	GorK	4-5	OilPull.....K	12-20	....	4	Own	2-6 x 8	K,D	3								
E.S.....AA	12-20	1095	4	Own	4-4 1/2 x 4	G,K,D	3	OilPull.....H	16-30	....	4	Own	2-7 x 8 1/2	K,D	4								
								OilPull.....G	20-40	....	4	Own	2-8 x 10	K,D	5-6								
Fagel.....D	9-18	1175	4	Lye.	4-3 1/2 x 5	Gas.	2																
Farm Horse..B	18-30	1885	4	Clim	4-5 x 6 1/2	G,K	4																
Fich..4 Drive	20-35	1850	4	Clim.	4-5 x 6 1/2	GorK	3-4																
Fordson.....	-18	395	4	Own	4-4 x 5	G,K	2																

ABBREVIATIONS: G—Gasoline. K—Kerosene. D—Distillate. Plow capacity varies in relation to operating conditions. Figures are based on 14 in. plow. Engine Make: Beav.—Beaver. B & S—Briggs & Stratton. Clim.—Climax. Cont.—Continental. Dom.—Domas. Evin.—Evinrude. Herc.—Hercules. LeR.—LeRoy. Midw.—Midwest. Nway.—New Way. Nor.—Northway. Ste.—Stearns. Wauk.—Waukesha. Weid.—Weidely. Wis.—Wisconsin. *—Crawler type. All others are wheel type. †Price includes plows. ‡Track runner. †Industrial Tractor. *Garden Tractor. **Steam Tractor.

Specifications of Current Passenger Car Models

PRICES						Wheel Base	Tires	Engine Make	Cylinders: Bore and Stroke	Rated Horse Power (N.A.C.C.)	NAME AND MODEL	Carburetor	Starting and Lighting	Ignition	Clutch, Type and Make	Gearset	Universal: Type and Make	Rear Axle Type and Make	Gear Ratios
2-Pass.	5-Pass.	7-Pass.	Sport	Coupe	Sedan														
\$1995c	\$4500c	\$4500	\$1885c		\$6500	136	33x5	Cont.	6-3 1/2 x 5 1/4	31.51	Ambassador.....R	Strom.	West.	Bosch	m-d B-L	B-L	f Norwalk	F Tim.	4.45
	1785	1850			2485	127	33x4 1/2	H-S.	6-3 1/2 x 5	29.40	American.....D-66	Strom.	G-D.	A-K	s-p B&B	B & B	m Hartford	F Sals.	4.50
	1650					127	33x4	Ow.	2-		American.....Steamer	None	L-N	L-N	None	None			1.75
1495	1495	1595	1595c	1450c	1995d	114	32x4	Cont.	6-3 1/2 x 4 1/4	23.44	Anderson, Aluminum 6	West.	West.	s-p B&B					
1785p			1915c	1995c	1995d	120	33x4	Cont.	6-3 1/2 x 4 1/2	27.34	Anderson.....Series 40	Rayfield.	Remy	Remy	s-p B&B	Durston.	f Snead	3 1/2 F Sals.	4.50
	2620	2645	3625	3695	130	34x4 1/2	Ow.	8-3 1/2 x 5	33.80		Apperson.....8-21-S	Johnson.	Bijur.	Remy	m-d Own	Ow.	m Sterling	1 1/2 F Own.	4.25
1575	1475	1545n	1895n	2275	2345	121	32x4	Cont.	6-3 1/2 x 4 1/2	27.34	Auburn.....6-51	Strom.	Remy	Remy	s-p B&B	G-L	m Universal	1 1/2 F Sals.	4.75
			1995n																
	1395				1850d	118	32x4	Cont.	6-3 1/2 x 4 1/4	23.44	Barley.....	Delco	Delco	s-p B&B	Fuller	f M&E	Col		
1800	1800			2400	2500	121	32x4	Cont.	6-3 1/2 x 5 1/4	25.35	Bay State.....	Strom.	Delco	Delco	s-p B&B	Warner	m Spicer	3 1/2 F Col	4.67
2950	2950c			3950	3950	121	32x4	Buda.	4-3 1/2 x 5 1/2	22.50	Biddle.....B1 & B5	Zenith.	G-D	Simms	s-p Warner	Warner	m Spicer	3 1/2 F Std.	4.50
5000	5000			7000	7000	125	32x4 1/2	Ow.	4-4 x 5 1/2	25.60	Brewster.....	Zenith.	USL	Bosch	e Own	Ow.	F Own.	3 1/2 F Own.	3.92
865	885	725g		1175	1395	109	31x4	Ow.	4-3 1/2 x 4 1/2	18.23	Buick.....1923-34-5-6-7-38	Marvel.	Delco	Delco	m-d Own	Ow.	m Own.	3 1/2 F Own.	4.66
					1325														
1175	1195	975g		1935	1985	118	33x4	Ow.	6-3 1/2 x 4 1/2	27.34	Buick.....1923-41-4-5-47	Marvel.	Delco	Delco	m-d Own	Ow.	m Own.	3 1/2 F Own.	4.60
		1435	1625a	1895	2195	124	34x4 1/2	Ow.	6-3 1/2 x 4 1/2	27.34	Buick.....1923 48-9-50-4-55	Marvel.	Delco	Delco	m-d Own	Ow.	m Own.	3 1/2 F Own.	4.90
			1675c																
2885	2885	2885		3675	3950	132	33x5	Ow.	8-3 1/2 x 5 1/2	31.25	Cadillac.....61	Ow.	Delco	Delco	m-d Own	Ow.	m Spicer	F Tim.	4.50
				3750d	4300														
1750	1790			2480	2575	122	32x4 1/2	Cont.	6-3 1/2 x 4 1/2	27.34	Case.....X	Rayfield.	Delco	Delco	m-d Own	Ow.	f Snead	3 1/2 F Col	5.25
	1990	2250	1950	2480	2975	129	34x4 1/2	Cont.	6-3 1/2 x 5 1/4	31.54	Case.....W	Rayfield.	Delco	Delco	m-d Own	Ow.	f Arrac.	3 1/2 F Col	4.45
1185	1185			1595	2295	117	32x4	Ow.	6-3 1/2 x 4 1/2	25.35	Chalmers.....1922	Strom.	A-L	Remy	m-d Own	Ow.	m Hardy	3 1/2 F Adams	5.13
		1345		1585	122	32x4	Ow.	6-3 1/2 x 4 1/2	25.35	Chalmers.....1922	Strom.	A-L	Remy	m-d Own	Ow.	m Hardy	3 1/2 F Adams	5.13	
1495	1495c	1645	1595a	1995c	2295d	123	33x4	Ow.	6-3 1/2 x 5	29.40	Chandler.....Six	Rayfield.	Bosch	Bosch	s-p B&B	Ow.	f Own.	F Own.	4.45
					2375f														
510	525	425g		840c	860	102	30x3 1/2	Ow.	4-3 1/2 x 4	21.53	Chevrolet.....Superior	Zenith.	A-L	Remy	e Own	Ow.	m Own.	1 1/2 F Own.	3.66
				680k															
1085	995		1260	1295d	1495	112	32x4	Ow.	6-3 1/2 x 4 1/2	22.50	Cleveland.....41	Strom.	Bosch	Bosch	s-p Own	Ow.	m Mech.	3 1/2 F Own.	4.45
2685		2685	2685c	3285b	3285c	127 1/4	33x5	Nort.	8-3 1/2 x 4 1/2	39.20	Cole.....890	Johnson	Delco	Delco	e North.	North.	m Spicer	F Col.	4.46
					3685f														
1475	1475		1475c	1925c	115	32x4	Cont.	6-3 1/2 x 4 1/2	27.34	Columbia.....Elite	Strom.	A-L	A-K	s-p B&B	Durston.	m Spicer	3 1/2 F Tim.		
995	985			1395d	115	31x4	Cont.	6-3 1/2 x 4 1/2	23.44	Columbia.....Light Six	Strom.	A-L	A-L	s-p B&B	Durston.	m Spicer	3 1/2 F Tim.		
1395	1395		1195b	2065b	116	32x4	Falls.	6-3 1/2 x 4 1/2	23.44	Courier.....	Till.	Bijur.	A-K	s-p B&B	Muncie.	f Norwalk	3 1/2 F Col.	5.00	
			1495c																
3000	3000	3000		4500	122 1/2	32x4	Cont.	6-3 1/2 x 5 1/4	31.54	Crawford.....22-6-60	Strom.	West.	Bosch	m-d B-L	B-L	Spicer	1 1/2 F Tim.		
			3500		135	33x5	Cont.	6-3 1/2 x 5 1/4	31.54	Crawford-Dagmar.....6-60	Zenith.	West.	Bosch	m-d B-L	B-L	Spicer	1 1/2 F Tim.		
4350b	4350c	4350		6000	132	33x5	Ow.	8-3 1/2 x 5	45.01	Cunningham.....V	Strom.	Delco	Delco	m-d Own	Ow.	f Snead	F Tim.	4.23	
	1195			1795	114	31x4	Cont.	6-3 1/2 x 5 1/4	39.20	Daniel.....D-19	Zenith.	Delco	Delco	m-d Own	Ow.	m Spicer	F Tim.	4.50	
1595	1595	1495	1795	1795	114	31x4	Cont.	6-3 1/2 x 5 1/4	39.20	Davis.....71	Strom.	Delco	Delco	s-p B&B	Warner	m Peters	3 1/2 F Tim.	5.10	
1175	1175	1295c	1215	1515	1595	112	32x4	H-S.	4-3 1/2 x 5	19.60	Dixie Flyer.....H-S-70	Strom.	Delco	Delco	s-p B&B	Warner	m Peters	3 1/2 F Tim.	5.15
850	880			980b	1195d	114	32x4	Ow.	4-3 1/2 x 5	24.03	Dodge Brothers.....	Stewart.	N.E.	N.E.	m-d Own	Ow.	m Own.	1 1/2 F Own.	4.16
3350	3950c	3950		4985c	5750f	132	33x5	Ow.	6-4 x 5	38.40	Dodge Brothers.....	Strom.	West.	Bosch	m-d Own	Warner	m Spicer	F Tim.	4.23
865	865		1015a	1240	1370	108	31x4	D-Ly.	4-3 1/2 x 5	19.60	Dort.....19-14	Carter.	Bosch	Conn.	m-d Detaff.	Ow.	m Mech.	3 1/2 F Flint.	4.66
			1015d	1020k	1070k														
990	990		1145	1195	115	31x4	Falls.	6-3 1/2 x 4 1/2	23.44	Dort.....25-20	Carter.	Bosch	Bosch	m-d Detaff.	Ow.	Mech.	3 1/2 F Flint.	4.66	
			1365	1495	104														
1275	1275		1650	1975	132	32x4 1/2	Ow.	4-25 x 4 1/2	11.03	Driggs.....	Zenith.	Bosch	Bosch	s-p Hoos.	Mech.	m Spicer	3 1/2 F Own.	4.75	
6500	6500	6750		7800	7800	134	33x5	Ow.	8-22 x 5	26.45	Duesenberg.....Straight 8	Strom.	Delco	Delco	s-p Own	Ow.	f Own.	1 1/2 F Own.	4.81
3000	3200			3800	4000	124	32x4 1/2	Ow.	6-3 1/2 x 5 1/2	24.81	Du Pont.....A	Y&T.	West.	Eisenmann	m-d B-L	B-L	m Spicer	Col.	4.50
890	890			1365	1365	100	31x4	Cont.	4-3 1/2 x 4 1/2	24.03	Durant.....A-22	Till.	A-L	A-L	s-p Own	Ow.	m Spicer	3 1/2 F Adams	4.30
1800	1800			2250	2400	123 1/2	32x4 1/2	Anst.	6-3 1/2 x 4 1/2	25.35	Durant.....B-22	Rayfield.	A-L	A-L	s-p Anst.	Warner	m Spicer	3 1/2 F Tim.	5.15
1485	1095	950g		1395c	1795	112	32x4	Ow.	4-3 1/2 x 5 1/2	18.91	Earl.....40	Scoc.	A-L	Conn.	s-p B&B	Ow.	f Own.	3 1/2 F Own.	3.66
1095	1095		1095	1345	118	33x4	Lyc.	4-3 1/2 x 5	19.60	Elcar.....K-4	Strom.	Delco	Delco	s-p B&B	Muncie.	m Peters	3 1/2 F Sals.	4.50	
1395	1395		1395	1975	2065	118	33x4	Cont.	6-3 1/2 x 4 1/2	27.34	Elcar.....8-R	Strom.	Delco	Delco	m-d Warner	Warner	m Spicer	3 1/2 F Sals.	4.50
1125c	1125		1165	1695	1615	118	33x4	Falls.	6-3 1/2 x 4 1/2	23.44	Elgin.....K-1	Strom.	West.	Wagner	s-p B&B	Mech.	m Mech.	3 1/2 F Col.	4.66
	1015			1145k	1895	108 1/2	32x4	Ow.	4-3 1/2 x 5	18.23	Essex.....	Ow.	Bosch	Bosch	m-d Own	Ow.	m Spicer	3 1/2 F Own.	4.66
				1245k															
269f	298a	235g		530	100	30x3 1/2	Ow.	4-3 1/2 x 4	22.50	Ford.....T	Ow.	Ow.	Ow.	m-d Own	Ow.	m Own.	1 1/2 F Own.	3.63	
				725															
390f	3900		4900	4900	132	32x4 1/2	Ow.	6-3 1/2 x 5	27.34	Fox.....7F	Zenith.	West.	Bosch	m-d B-L	B-L	Spicer	1 1/2 F Tim.	4.45	
1000	1050	1750g		2750	2850	115	32x4	Ow.	6-3 1/2 x 4	25.35	Franklin.....10	Ow.	N.E.	A-K	s-p B&B	Ow.	m Spicer	1 1/2 F Own.	4.75
965	965			1115k	1385d	112	32x4	Lyc.	4-3 1/2 x 5	21.76	Gardner.....T-R & G	Carter.	West.	West.	s-p B&B	Mech.	m Mech.	3 1/2 F Flint.	4.80
1385	1385			1895	1915	116	32x4	Ow.	6-3 1/2 x 4 1/2	23.44	Grant.....	Strom.	Bijur.	A-K	s-p B&B	Durston	m Spicer	3 1/2 F Col.	4.66
490	490			760	100	30x3 1/2	Ow.	4-3 1/2 x 4	21.03	Gray.....	Scoc.	West.	West.	m-d Own	Ow.	m Mech.	1 1/2 F Tim.	3.90	
2475	2475c		3250	3175	120	32x4 1/2	Weid.												



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Specifications of Current Passenger Car Models

PRICES						Wheel Base	Tires	Engine Make	Cylinders: Bore and Stroke	Rated Horse Power (N.A.C.C.)	NAME AND MODEL	Carburetor	Starting and Lighting	Ignition	Clutch: Type and Make	Gearset	Universal: Type and Make	Rear Axle: Type and Make	Gear Ratios	
2-Pass.	5-Pass.	7-Pass.	Sport	Coupe	Sedan															
\$3985	\$4090c	\$4090		\$5500	\$5500	132	33x5	Own.	8-3 1/4 x 5 1/4	33.80	LaFayette.	Johnson.	Delco.	Delco.	m-d Own.	Own.	m Own.	F Own.	4.58	
5500	5500	5500		5500	5500	134	32x4 1/2	Own.	6-3 1/2 x 5 1/4	33.75	Leach.	Rayfield.	Delco.	Delco.	m-d Ansted.	Own.	m.f	F Tim.		
1695	1695	1795	\$2045d	2345c	2545d	123	32x4 1/2	Anst.	6-3 1/2 x 4 1/2	25.35	Lexington.	Rayfield.	G-D.	Conn.	m-d Ansted.	Warner.	f Snead.	2 1/2 F Tim.	5.10	
1575	1395		1575	2085	2245	117	32x4	Own.	6-3 1/2 x 5	23.44	Liberty.	Strom.	Wagner.	Wagner.	s-p B&B.	Detroit.	m Spicer.	1 1/2 F Tim.	4.80	
3800	3800c	3800		4400d	4700d	136	33x5	Own.	8-3 3/8 x 5	36.45	Lincoln.	Strom.	Delco.	Delco.	m-d Own.	Own.	m Spicer.	F Tim.	4.58	
6900g	7800c	7600		10500	11000	142	35x5	Own.	6-4 1/2 x 5 1/2	48.60	Locomobile.	Ball&B.	West.	Delco.	m-d Own.	Own.	m Own.	F Own.	3.75	
3385	3185c	3185		3985	4385	136	32x4 1/2	Own.	6-3 1/2 x 5 1/2	33.75	Marmont.	Strom.	Delco.	Delco.	m-d Own.	Own.	m Spicer.	3 1/2 F Own.	3.75	
885	885			985	1335	109	31x4	Own.	4-3 3/4 x 4 1/2	21.03	Maxwell.	Stewart.	A-L.	Simms.	c Own.	Own.	Own.	2 1/2 F Own.	1.56	
6300	6300c	6300		7500	7500	140	33x5	Own.	6-4 1/2 x 6	48.60	McFarlan.	Rayfield.	West.	Splitdorf.	s-p B&B.	B-L.	m Peters.	F Tim.	3.50	
3950	3950c	3950c		4850	5250	132	32x4 1/2	Own.	4-3 3/4 x 5 1/4	22.50	Series 5.	Ball&B.	West.	Eisemann.	m-d Own.	Own.	m Spicer.	F Own.	3.87	
1895	1895	3750		5000	5000	132	32x4 1/2	Own.	6-3 1/2 x 5	33.75	Meritor.	Strom.	Delco.	Eisemann.	s-p B&B.	Muncie.	f Snead.	3 1/2 F	3.77	
1490b	1590		1850c	2050c	2275d	119	32x4	Cont.	6-3 1/2 x 4 1/2	25.35	Merit.	Strom.	Delco.	Delco.	s-p B&B.	Muncie.	f Snead.	F Col.	4.60	
950	950		1690	2050c	2275d	120	32x4	Own.	6-3 1/2 x 5	29.40	Mitchell.	Strom.	Remy.	Remy.	s-p B&B.	Own.	m Own.	F Own.	4.42	
1295	1195	p1445d	1885c	1585c	1695	115	31x4	Own.	4-3 1/2 x 4 1/2	16.90	Mitchell.	Strom.	Remy.	Remy.	s-p B&B.	Own.	m Own.	F Own.	4.42	
1785	1785	1785	1885	2785	2785f	128	33x4 1/2	Cont.	6-3 1/2 x 4 1/2	23.44	Monroe.	Zenith.	Conn.	Conn.	m-d Own.	Mech.	m Universal.	3 1/2 F Tim.	5.30	
				2785f	2845c	128	33x4 1/2	Cont.	6-3 1/2 x 4 1/2	27.34	Moon.	Strom.	Delco.	Delco.	s-p B&B.	Warner.	m Spicer.	1 1/2 F Tim.	4.80	
				2040d	2190f	121	33x4	Own.	6-3 1/2 x 5	25.35	Nash.	Marvel.	Delco.	Delco.	s-p B&B.	Own.	m Own.	1 1/2 F Own.	4.50	
1210	1240		1390	1890c	2190f	127	34x4 1/2	Own.	6-3 1/2 x 5	25.35	Nash.	Marvel.	Delco.	Delco.	s-p B&B.	Own.	m Own.	1 1/2 F Own.	4.50	
915	935			1195k	1275k	112	33x4	Own.	4-3 3/8 x 5	18.23	Nash Four.	Schebler.	Delco.	Delco.	s-p B&B.	Own.	m Own.	1 1/2 F Own.	4.88	
2475b	2475c	2375	3150	3250c	3825f	130	32x4 1/2	Own.	6-3 1/2 x 5 1/4	29.40	National.	Rayfield.	West.	Delco.	s-p B&B.	B-L.	m Arvac.	F Col.	4.08	
2500	2500c	2600c		3500d	3500d	128	32x4 1/2	Cont.	6-3 1/2 x 5 1/4	25.35	Noma.	Claudel.	Delco.	Delco.	s-p B&B.	Detroit.	m Spicer.	1 1/2 F Tim.	4.45	
2500	2500			5500	5500	128	33x5	Bea.	6-3 1/2 x 5 1/2	29.40	Noma.	Claudel.	Delco.	Delco.	s-p B&B.	Detroit.	f Spicer.	1 1/2 F Tim.	4.45	
975	995	795g	1165c	1445d	1545	115	32x4	Lyc.	4-3 1/2 x 5	19.60	Norwalk.	Zenith.	Dyneto.	Delco.	s-p B&B.	G-L.	m Universal.	3 1/2 F Col.	5.10	
				1185a		115	32x4	Own.	6-2 1/2 x 4 1/2	18.99	Oakland.	Marvel.	Remy.	Remy.	c Own.	Muncie.	m Mech.	F Own.	4.33	
3750c	3750	3850	3750c	4500c	4800f	134	33x5	Cont.	6-3 3/8 x 5 1/4	31.54	Ogden.	Rayfield.	Bosch.	Bosch.	m-d B-L.	B-L.	m Own.	F Col.	1.00	
955	975	1350d	1075	1475	1595	115	32x4	Own.	4-3 1/2 x 5 1/4	21.86	Oldsmobile.	Zenith.	A-L.	Remy.	s-p B&B.	Warner.	m Own.	3 1/2 F Own.	4.33	
1735c	1850c	1735		1875	2025	115	32x4 1/2	Own.	8-2 1/2 x 4 1/2	26.45	Oldsmobile.	Ball&B.	Delco.	Delco.	c Own.	Warner.	m Own.	3 1/2 F Own.	4.33	
1625p	1375	1675	1875	2025	2115	122	33x4 1/2	Own.	8-2 1/2 x 4 1/2	26.45	Oldsmobile.	Johnson.	Delco.	Delco.	s-p B&B.	Warner.	m Spicer.	1 1/2 F Own.	5.10	
525	525	425g		795	875	100	30x3 1/2	Own.	4-3 3/4 x 4	18.23	Overland.	Till.	A-L.	Conn.	s-p B&B.	Own.	m Own.	1 1/2 F Own.	4.50	
2485	2485	2250g		3175	3275	126	33x4 1/2	Own.	6-3 1/2 x 5	27.34	Packard.	Own.	A-K.	Delco.	m-d Own.	Own.	f Spicer.	1 1/2 F Own.	4.30	
3850	3850	3850		5240	5400	136	35x5	Own.	12-3 x 5	43.20	Packard.	Own.	A-K.	Delco.	m-d Own.	Own.	f Spicer.	1 1/2 F Own.	4.30	
1465	1465	1290c		1995	2245	119	32x4	Own.	6-3 1/2 x 5	25.35	Packard.	Own.	Bijur.	Delco.	m-d Own.	Own.	f Spicer.	1 1/2 F Own.	4.66	
2495b		2195	2245	3100	3155	131	33x4 1/2	Cont.	6-3 1/2 x 5	33.75	Paige.	Rayfield.	Remy.	A-K.	s-p Long.	Own.	m Universal.	3 1/2 F Salis.	1.75	
	1390	1425	2295	2395	2395	120	32x4 1/2	Cont.	6-3 1/2 x 5	33.75	Paige.	Rayfield.	Remy.	A-K.	s-p Long.	Warner.	m Mech.	1 1/2 F Tim.	1.60	
3300	2990c	2990		3300a	3990d	128	33x5	Own.	6-3 3/8 x 4 1/2	27.34	Paterson.	Strom.	Delco.	Delco.	s-p B&B.	Durston.	m Hartford.	1 1/2 F Std.	4.50	
				4090f					8-3 1/2 x 5	33.80	Peerless.	Ball&B.	Delco.	Delco.	m-d Own.	Own.	M Spicer.	3 1/2 F Tim.	4.90	
5250	5250c	5250		6800	6900	138	33x5	Own.	6-4 x 5 1/2	38.40	Pierce-Arrow.	Own.	Delco.	Delco.	m-d Own.	Own.	m Spicer.	1 1/2 F Own.	3.93	
				700																
2050	2000	2050		2950	3000	126	32x4 1/2	H-S.	6-3 1/2 x 5	25.35	Pilot.	Till.	Bijur.	Conn.	s-p B&B.	Muncie.	m Hartford.	3 1/2 F Col.	1.23	
3150	3100c	3250		4300	5100	126 1/2	32x4 1/2	Own.	6-3 3/8 x 5 1/2	27.34	Premier.	Johnson.	Delco.	Delco.	s-p B&B.	Own.	m Spicer.	3 1/2 F	1.58	
1005	1005			1750	1823	117	32x4	Falls.	6-3 1/2 x 4 1/2	23.44	Premier.	Johnson.	Wagner.	Wagner.	s-p B&B.	Mech.	m Spicer.	1 1/2 F	1.66	
1665	1665			2385	2475	116	32x4	Own.	4-3 3/8 x 5	22.50	R & V Knight.	Strom.	Wagner.	Wagner.	s-p B&B.	B-L.	m Spicer.	F Salis.	1.75	
2475	2475c	2475		3015	3105	127	32x4 1/2	Own.	6-3 1/2 x 4 1/2	29.40	R & V Knight.	Strom.	Wagner.	Wagner.	s-p B&B.	B-L.	m Spicer.	1 1/2 F Tim.	1.10	
1595	1645	1485	1745	2355c	2435f	120	33x4	Own.	6-3 1/2 x 5	24.34	Reo.	Rayfield.	N.E.	N.E.	m-d Own.	Own.	m.f Own.	1 1/2 F Own.	1.70	
3200	3200	3200		4000	4000	131	32x4 1/2	Dues.	4-4 1/2 x 6	28.90	ReVer.	Strom.	West.	Bosch.	m-d B-L.	B-L.	m Spicer.	3 1/2 F Std.	4.00	
2685	2485c	2685		3585	3585	128	32x4 1/2	Own.	6-3 1/2 x 4 1/2	23.44	Rickenbacker.	A.	Strom.	Simms.	c Own.	Own.	m Universal.	3 1/2 F Own.	4.88	
3785	3485	3650c	3650c	4650c	4650c	128	32x4 1/2	Dues.	4-4 1/2 x 6	28.90	Roamer.	Strom.	Bijur.	Bosch.	s-p G-L.	G-L.	f Snead.	1 1/2 F Tim.	3.77	
10900	10900	10950		13150	14315	143 1/2	35x5	Own.	6-4 1/2 x 4 1/2	48.60	Roamer.	Strom.	Bijur.	Splitdorf.	m-d B-L.	B-L.	f Snead.	1 1/2 F Tim.	3.77	
				12900							Rolls-Royce.	Own.	Bijur.	Bijur.	c Own.	Own.	m Own.	F Own.	3.25	
1195	1195			1795	1795	112	32x4	Own.	4-3 1/2 x 5	19.60	Saxon.	Strom.	Wagner.	Wagner.	s-p Detlaff.	Covert.	m Peters.	3 1/2 F	4.75	
1645	1645			2645	2645	118	33x4	Cont.	6-3 1/2 x 4 1/2	25.35	Sayers Six.	Strom.	Delco.	Delco.	s-p B&B.	G-L.	m Arvac.	1 1/2 F Std.	4.75	
875	875			108	108	108	30x3 1/2	Lyc.	4-3 1/2 x 5	19.60	Seneca.	Zenith.	A-L.	A-L.	s-p B&B.	G-L.	m Universal.	F	4.75	
1095	1095			112	112	112	31x4	Lyc.	4-3 1/2 x 5	19.60	Seneca.	Zenith.	A-L.	A-L.	s-p B&B.	G-L.	m Universal.	F	4.75	
980	980			1685	1685	114	32x4	Supr.	4-3 3/8 x 5	18.23	Sperling.	Zenith.	Bijur.	Splitdorf.	s-p B&B.	Warner.	m Hartford.	3 1/2 F Peru.		
2150	2150	2395	2395	2750	3200	127	34x4 1/2	Own.	8-3 1/2 x 5	33.80	Standard.	Zenith.	West.	Splitdorf.	s-p B&B.	G-L.	m Arvac.	1 1/2 F Tim.	4.45	
2750	2750	2750	2425g	3950c	3985f	130	32x4 1/2	Own.	2-4 x 5	25.35	Stanley.	Strom.	Bijur.	None.	None.	None.	None.	None.	1 1/2 F Own.	1.50
1765	1765			2750		118	33x4	Cont.	6-3 1/2 x 4 1/2	25.35	Stanwood Six.	Strom.	West.	A-K.	s-p B&B.	G-L.	m Peters.	1 1/2 F Std.	4.50	
319r	348s	285g		580	615	102	30x3 1/2	Cont.	4-3 1/2 x 4 1/2	15.63	Star.	Till.	A-L.	A-L.	s-p	Own.	f Spicer.	Tim.	4.87	
2250	2250	2450		3150	3450	125	34x4 1/2	Own.	4-3 1/2 x 5 1/2	22.50	Stearns-Knight.	Rayfield.	West.	A-K.	m-d Own.	Own.	f Climax.	1 1/2 F Own.	4.50	
2700	2700	2850		3500	3700	130	34x4 1/2													